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COMPANION

TO THE

BOTANICAL MAGAZINE;

BEING

A JOURNAL,

CONTAINING SUCH INTERESTING BOTANICAL INFORMATION, AS DOES NOT COME WITHIN THE PRESCRIBED LIMITS OF THE MAGAZINE; WITH OCCASIONAL FIGURES.

By W. J. HOOKER, LL. D. F. R. A. & L. S.,

And Regius Professor of Botany in the University of Glasgow.

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COMPANION

TO THE

BOTANICAL MAGAZINE.

JOURNAL OF AN ASCENT TO THE SUMMIT OF ADAM'S PEAK, CEYLON.

(Accompanied by a Sketch of the Temple at the summit, TAB. I.*)*

I HAVE already *(Bot. Misc. Second Series, vol. I. p.* 180*)* given a brief notice of the exertions of Col. and Mrs. Walker in the cause of Botany, in the fertile and interesting island of Ceylon. In their various tours the vegetable productions of the country have occupied a large share of their attention; so that Dr. Graham's Herbarium and my own have been greatly enriched by many rarities which have been communicated to us at various times, and of which a more particular notice will be given in this journal. These specimens too, have been, in many instances, accompanied by drawings made on the spot, and which have of course added greatly to their value and usefulness. One of the most interesting of their excursions was to the summit of Adam's Peak, in the beginning of 1833; and an accurate journal of it having been kept by Mrs. Walker, I have the permission of that highly accomplished lady to insert it in the present work, though not without the expression of many fears, on her part, "that it is too superficial to be of any value in such a publication, since it was written merely as a memorandum of places and events, with a view to refresh her own memory." I shall be much mistaken if it do not prove as attractive to the readers of these pages as it has been productive of gratification to myself; and I could wish that many other spots in our distant colonies, celebrated in history, and for their natural productions, might meet with an equally faithful and scientific journalist.

W. J. H.

Jan. 24th, 1833.—Left Colombo about two p. m. and drove to Cadawelle, about ten miles; road rather bad in some places, but we were not under the necessity of getting out of the gig as we had expected; the country flat and uninteresting; in the jungle on each side of the road we remarked most of the plants common in the neighbourhood of Colombo, *Clerodendron infortunatum, Croton bacciferum, Melastoma Malabathrica, Mussænda frondosa, Tabernæmontana dichotoma, Cerbera Manghas, &c. &c.* Nothing new, but a species of Guava *(Psidium)* with a very small leaf, which I had not remarked before. At Cadawelle we mounted our horses; our road continuing through the same description of country, most of the way close to the banks of the Kalaniganga, until we reached Hangwelle, (about eight miles) where we were to pass the night; the rest-house here is situated within the ditch and walls of an old fort, built by the Portuguese, or Dutch, and formerly of considerable consequence, but now garrisoned by an old invalid serjeant: it overlooks the river, on a high bank, covered with trees, and low jungle or underwood. The accom-

modation at the rest-house was clean and comfortable. We were visited by the Modelear, or native headman of the district, a remarkably civil, respectable person, who understands and speaks English well; he brought us a present of fruit from his garden, consisting of oranges, pine-apples, &c.

25th.—Up before day-break, and on horseback almost before we could see our way over the frail-looking wooden bridge across the wide ditch of the ancient fortress. A very delightful ride of eleven miles, brought us to Sittanaka, formerly the seat of government of Raaja Singha, king of Kandy, between the years 1581 and 1592. The place now consists of a few mud huts in the neighbourhood of the rest-house. The road, with the exception of a few bad places, and a number of very fragile decayed-looking wooden bridges, which appear hardly equal to support the weight of a horse, is, upon the whole, a tolerable bridle path, and I found the variety of a little up and down-hill work, a pleasant change after the dead level of our yesterday's journey; and I think less fatiguing. We had some fine views of Adam's Peak and the intervening mountains, but were disappointed by finding few plants in flower. In the forest, through which the last mile of our road lay, we saw many magnificent Ferns, some from twelve to twenty feet in height; and we carried to the rest-house with us specimens of a large shrub, or rather a small tree, new to Col. W., but which he thinks belongs to the *Dilleniaceæ,* flowers yellow. Elephants, we are told, abound in this neighourhood, but we saw none. After breakfast our servants brought us a few plants, among which we found two *Sidas,* new to us. I never suffered so much from heat, in Ceylon, as during the forenoon of this day; the rest-house was exposed to the direct rays of the sun, without shade of any kind, and the wind blew like the hot winds of India. At four o'clock set off for the first time in my little Madeira palankeen, in shape something between a cradle and a coffin, and found it a very comfortable conveyance. About half way we were met by Capt. L., who returned with us, and escorted us to his hospitable mansion, at Ruanwelle, where we arrived about six o'clock.

26th.—The fort, or military station, of Ruanwelle, is situated very prettily, at the junction of two rivers the Kalanygunga, and the Goosoogoddeoyah, the word *gunga* in Cingalese meaning river, and *oyah* a smaller stream; in the evening we went down the Kalanygunga for about two miles in Capt. L's boat; landed under a steep bank, and proceeded to visit a Boodhist Temple under a great mass of rock in the side of a steep hill, the whole of which is covered with singularly detached masses of rock, under many of which are caves, or hollows, so large that, our friend had converted one of them into a dwelling-house, where he lived with his wife and family for upwards of two months during the hot season, finding it considerably cooler than the fort of Ruanwelle. A rill of limpid and very cold water, trickling from the top of a neighbouring cave, was converted into a delicious bath. There is a tradition among the natives that from the top of the largest and highest of these boulders of rock, a queen of Candy, in former days, precipitated herself, or was thrown by her husband, but the legend does not seem to be very distinct in particulars. Porcupines are numerous on this hill. The old priest, who (I believe, considered me a proselyte to Boodhism, when he heard I had been to the top of Adam's Peak, and was so far on my way on a second *pilgrimage)* presented me with a number of their quills, which are much smaller than those I have seen in the upper provinces of Bengal. In the botanical way we found nothing in flower; but I am convinced there must be many and various plants on this remarkable mountain, which is watered by several springs seeming to rise among the rocks, and trickle in numerous rills down its side. The soil too varies; some parts are wooded, others open, affording localities for plants of different habits and descriptions. It is also remarkable, as having formed the left

flank of one of the strongest positions taken up by the Kandyans during the war, the river protecting their right: as far as I can judge on such a subject, the post seems to have been well chosen.

27*th*.—Our ride this evening was to view the spot where Major Haddock, of the 97th Regiment was killed by an elephant, little more than half a mile from his own house at Ruanwelle. The jungle is thick and, in attempting to escape, Major H. took a wrong turn and met the animal in a narrow path where escape was impossible.

28*th*.—Started at six A.M. on horseback, accompanied by Capt. L., to continue our journey; road good; through a fine valley bounded on each side by low hills. Crossed the same river, called at Ruanwelle, the Kalanygunga; but here it goes by another name, which I forget. The natives give the same river a dozen different appellations; calling it after every village it passes; taking the name of one until it reaches the next, which is then bestowed upon it. The scenery continued much the same for about eight miles, when we halted and had a *dejeuné à la fourchette*, under a group of magnificent *iron-wood trees, Mesua ferrea*.

After breakfast we resumed our journey in our *moonsheels*, sending our horses back to Colombo, the road from hence being considered unfit for cavalry: our friend, Capt. L., who had kindly escorted us thus far on our way, returned to Ruanwelle. Our route continued through the same valley, but became more rugged, with occasional ascents and descents, less cultivation, and the jungle more dense. Among the most remarkable of the trees we saw in flower, was the *Cinchona thyrsiflora*, of great size and beauty. The same style of country continued for five or six miles with little variety, until we reached a long and steep ascent where a ridge divides the districts of the three Corles, on which Ruanwelle is situated, from Suffragam; and from the top of it we had a splendid view of that rich and fertile district. The descent was abrupt and rugged, and at the foot of it lay the village of Patberea, our place of rest for the night. The villages of Ceylon all consist of straggling mud houses, at a considerable distance from each other, generally concealed from the traveller by trees, but always to be discovered by the appearance of the *Cocoa Nut*, and *Areca Nut* trees; which, in the interior, where they are not so common as on the sea-coast, always indicate the vicinity of the habitation of man. Having travelled a cross road, on which there are no rest-houses, the headman of the village had been directed to prepare a place for our reception. Such temporary buildings are soon erected with a few posts and *cajans*, (the leaf of the cocoa nut plaited,) of which the roof, walls, and partitions are formed, and lined within with white cloths, furnished by the washermen of the village for the occasion, and fixed up, in a primitive and simple manner, with large thorns from the neighbouring jungle, which are used as pins. Our sitting apartment, that we might have the benefit of light and air, was only enclosed to the height of four feet, consequently we were completely exposed to the whole assembled population of the place; European travellers, particularly ladies, being a novel sight, we could, by no means, contrive to get rid of our disagreeable levée, until, fortunately for us, a heavy shower fell, which dispersed the crowd; though some braved a ducking for the gratification of their curiosity, and continued to watch all our proceedings. Our rural dwelling was situated in a thick grove of palms, consisting principally of the *Areca Nut, Areca catechu, Cocas nucifera* and *Gigantic Tallepot, Corypha umbraculifera.*

29*th*.—It was seven o'clock before we could collect our coolies, who were changed here for people of the district, through which we were about to travel, those who had brought us through the three Corles, returning from hence; we, therefore, waited to see our baggage off before we started. Our route at first lay, for about a mile, through the finest paddy fields I have ever seen; a tract of dense jungle succeeded, and on

emerging from it, we again travelled through extensive paddy fields, bearing the finest crops I ever saw in the country. The sides of the paths were fringed by several very pretty species of *Utricularia*, generally blue, purple, and white. In one field I mistook a range of scarecrows for a field of reapers. This valley appears to me the richest and most populous part of the interior of Ceylon through which I have travelled. The morning was foggy, and a haze continued to hang about the surrounding hills till the sun was pretty high, adding to the beauty and interest of the scene, by leaving something to the imagination of the traveller. For about five miles our road continued through paddy fields, we then crossed a river, the name of which I am ignorant of; but its banks were ornamented by the most magnificent bamboos I ever saw. Just before we approached it, we had a superb view of Adam's Peak and the surrounding mountains. After crossing the river, our road carried us for about a mile over fine turf, surrounded by high trees and bamboos, with occasional views of the Peak between. It was half-past nine when we reached Cooroowette, our halting place until the cool of the evening. Having here joined the main road, we found a wretched rest-house made to look a little decent by the mud walls having been covered with white cloths for our reception. Bad as the accommodation here is, I should have liked to have remained a day on account of the beauty of the surrounding scenery. I intended after breakfast to have taken a sketch of the Peak, &c.; but, alas! after breakfast no rock was visible; the mountains were completely enveloped in clouds, and a person arriving then, might, with apparent truth assert that, Adam's Peak was not to be seen from Cooroowette. This was the more provoking, as we did not intend to return by the same route, and are not likely to have another opportunity of seeing it again. At three, we proceeded on our journey, and found that we needed not to have delayed so long, on account of the sun, as we travelled through a forest of high trees, impervious to his rays: many of the trees in this forest were clothed to the top with the *Pandanus scandens,* which is very ornamental to those trees which do not throw out their branches till near the top, as is often the case in woods here. The road was good all the way through this forest, on emerging from which we travelled through low jungle; the country afterwards becoming more open and the scenery fine, generally on a descent all the way. As we approached Ratnapoora the ground became frequently marshy, and the road sometimes under water for three or four hundred yards on a stretch; and yet the defect in the landscape here is want of water. The mountains and woods are perfect; but no fine lake or river embellishes the scene. We found here almost all the plants common in the moist parts of the Cinnamon garden near Columbo; the *Nepenthes,* (formerly *distillatoria,)* very luxuriant; *Melastoma Malabathrica, Osbeckia, Burmannia disticha, Utricularia cærulea,* and other species, *Calyptranthes cumini, &c. &c.* The jungle, in some places, consisted entirely of dwarf *Bamboo;* and at others nothing was to be seen but the *Hedyotis suffruticosa:* then again the vegetation became more varied; and, we remarked, among many others, different species of *Croton, Dodonæa, Melastoma, Chironia;* and on the day we left Ruanwelle we found a very beautiful *Torenia,* perhaps, Mr. Moon's *T. stricta,* and the servants brought us a quantity of *Stemodia lutea,* which smells very strong of Camphor: I had remarked it in some of the paddy fields through which we passed. About five o'clock we reached the fort of Ratnapoora; where we were kindly received by Mr. J. of the Ceylon Rifles, commandant there.

30*th.*—Remained at Ratnapoora, preparing for our grand undertaking; this being the last European station on our route. An arm chair denuded of its legs, with Bamboos attached as shafts to carry it by, was prepared for Col. W. as an occasional help; though he proposed walking most of the way. Since we sent back our

horses, (which, by the way, we found we could have brought here at this dry season of the year, without difficulty,) he has travelled in a Kandyan moonshull, something resembling a hammock, swung on a pole, in which way, the native great men used always to travel. They are now, however, adopting English customs, and to be seen on horseback; and, where the roads admit, in gigs and palankeen carriages. The moonshull, however, has the advantage in very bad roads, as the coolies can carry it over any thing. The position being recumbent, Col. W. found he could not so well look about him, and, therefore, preferred the chair, which, being elevated on the shoulders of the bearers, gave him a commanding view; though, I thought, neither a very secure nor comfortable position. My little palankeen, which I before described, was very snug; but it had its defects, and inconveniences also: it was, however, very light and easily carried; being merely a strong frame of wood rattaned, as they do their bottoms.

31*st.*—In consequence of some delay in collecting our coolies, it was near one P.M. before we set off; the day excessively hot. Indeed, I think both Ruanwelle and Ratnapoora hotter than Columbo in the middle of the day; the heat there being tempered to our feelings by a cool breeze from the sea, although the range of the thermometer may be as high. As we were desirous of getting to Palabatula before dark, we had no time to lose. The atmosphere was particularly clear; and the outline of the mountains, which appeared quite close to us, almost harsh against the sky. Soon after leaving Ratnapoora we crossed the Cala-gunga, then so low that our people were hardly ankle deep in fording it. The road passes through a fertile and open country for about a mile and a half, when it becomes interspersed with jungle, so thick, on the banks of the river, as to conceal it from the traveller's view, though the sound of the rushing water is loudly heard. At every opening in the jungle the Peak presented itself directly before us, so majestic and so apparently inaccessible that he seemed to be setting us at defiance. I found afterwards that this formidable looking mountain is the Bæma Peak, which from Ratnapoora appears as high as *Sree pada*, (the Cingalese name for Adam's Peak,) and on this part of the road interrupts the view of it. In shape the two mountains are much alike, from this position. Leaving the river to our left we again passed through open country with some cultivation. Three miles from Ratnapoora came to the village of Matawelle, at the junction of a small stream, or *oyah*, with the Cala-gunga. The former we crossed, and halted for a few minutes to rest our coolies; and, while these are taking their rest, I may as well explain that, they are *human beings*, employed as porters and chairmen are at home, in carrying baggage or their fellow creatures. When employed in the last-mentioned manner, they are, on the continent of India, termed bearers, and consider themselves much superior to common coolies: here that distinction does not exist; so few people keep palankeens that there is no occupation for bearers as distinct from coolies. I have been induced to give this explanation in consequence of reading a note by the *learned* editor of one of the penny magazines, on an extract from some publication on India, I believe Capt. Mundy's Sketches, in which he tells his readers, "that coolies are small horses." He would have been nearer the mark if he had called them "*black cattle:*"—but mine have rested long enough, and I must proceed on my journey. Our route continued partly through jungle, with here and there patches of cultivation; sometimes approaching the river; at others leaving it a good deal to the left; the Bæma Peak almost constantly in view. At half-past three P.M. we reached Gelle-malle, and after resting our people for a quarter of an hour resumed our journey. The road, about a mile on each side of this place passed through fertile plains, and the neighbourhood appears populous. The rest-house is a mud edifice, consisting of two small rooms surrounded by a narrow

verandah, pleasantly situated on a little height, and distant from other houses. Fowls are so abundant here, that the full grown are sold for one *janam*, value three half-pence, and chickens six *pice*, or three farthings each. At a short distance from the rest-house we re-crossed the Cala-gunga, and after proceeding about a mile, we found the ascent begin in earnest. Hitherto we have had a few ups and downs; but upon the whole the country has been much upon a level, and the road might easily be made practicable for horses. Again crossing the river, which we have so long accompanied, we immediately commenced a rugged ascent; the low jungle gave place to very fine forest trees; and the nature of the vegetation altogether changed. We saw here a great variety of superb Ferns, and many plants which we had not seen before, but few in flower. Between Kahia Poora and Gelle-malle, almost the only flower I saw, in any quantity, was a pretty white *Convolvulus*, which covers many of the bushes, and even trees, hanging in beautiful festoons, loaded with blossom, from branch to branch. Likewise another species of the same genus, with purple flowers and less aspiring habits, being content to run along the ground. We also found a pretty white-flowered *Thunbergia*. The remaining part of our day's journey was frequently rugged and steep, with occasional levels—the forest trees sometimes gave place to the Bamboo, which, in one part of our route, had been recently burnt down, I suppose with a view to cultivation. At every opening the Bæma Peak still presented itself, and continued clear until we were very near Palabatula, when thick clouds came rolling over the top and down the sides of the mountain. At a quarter past six we reached our resting place for the night, having been exactly five hours and a half from Ratnapoora to Palabatula. The rest-house here is of the same description and dimensions as that at Gelle-malle, but not nearly so pleasantly situated, nor so clean, being surrounded by native houses; forming, indeed, the narrow end of an oblong quadrangle, of which a Boodhist temple constitutes one of the sides. In this temple are kept the sacred implements belonging to the temple on the top of Sree Pada, where they are sent during the time of pilgrimage; which commences at the beginning of the Cingalese year, about the end of February, and continues for three months; when one or two priests reside there, in a hut about fifty yards below the summit of the Peak.

Feb. 1st.—Breakfasted at eight; took a sketch, and set off at ten; our route the whole way was a precipitous ascent up the bed of a torrent at present quite dry. In many places, my position in my little palankeen became exceedingly awkward and uncomfortable, my *feet* being *higher* than my *head.* I tried to persuade the bearers to turn the vehicle, and carry me backward; but this they considered unlucky, and could not be prevailed on to do. My conveyance being very light and comparatively easily carried, I got far the start of Col. W., and my people had a long rest, waiting till he came up. Notwithstanding the difficulties of the road, they seem to enjoy themselves much on this journey; talking, laughing, and singing, even during the most laborious ascents, where, I should have thought all their breath necessary for the exertion they had to go through in climbing the mountain, and carrying me. Every time they visit the holy shrine on the top of the Peak, I believe, they consider a step towards heaven; and to be well paid at the same time gives them considerable satisfaction. At an *ambulam,* (or shed with rude benches round it, where the pilgrims may have a comfortable rest,) about half way, we stopped for some time, and from thence walked for half a mile, botanizing as we went, and finding at every step something quite new to us. We here began to recognize plants of the same genus with many which are common in the neighbourhood of Nervera Ellia, but of different species: several species of *Impatiens,* two of them very curious, *Scutellaria,* the Rumboddé *Nilloo (Acan-*

thaceæ,) with the back of the leaf deep purple, but not in flower, (the natives say it flowers but once in fifteen years,) with many other genera and species of the same family. Near the *ambulam* there is a remarkable echo, which returns the sound almost immediately, very loud and distinct. I observed that the mountains here form a kind of amphitheatre; and that almost opposite to the precipice, on the brink of which we stood, there is a mass of rock, which I think must occasion the echo; the voice seeming to be *reflected* back from it, if I may use the expression. After walking till I was quite tired, I got into my palankeen again, and proceeded as before, with my heels higher than my head. In this day's journey we had but one short descent which brought us near the source of the Cala-gunga, the river we have crossed so often since we left Ratnapoora. I saw but one little patch of cultivation after we left Palabatula; which, I believe, is the highest inhabitable place in this part of the island. We soon began to mount again, and after passing over two or three places, where I really expected to be tilted out of the palankeen, I was safely deposited at Diabetma, twenty-five minutes after two, P.M. The rest-house here is a large substantial building but wretchedly uncomfortable, being damp and dark, and black with dirt and smoke; it having been erected by government for the accommodation of the pilgrims who assemble here in great numbers; there being no huts or habitations of any kind after leaving Palabatula, excepting this rest-house. Our coolies seemed to consider themselves fully entitled to take up their abode under the same roof with us, and to prepare their food in the verandah, actually smoking us out of the house, although there are good out-houses and cook-rooms for the purpose. I never, any where else, saw them attempt such a thing before. Our servants were obliged to put out the fires they had kindled half a dozen times, before we could get rid of them. When Col. W. arrived, we looked over our plants and put specimens in paper; then set about making observations with map, compass, and telescope. We saw the sea plainly with the naked eye; also several large pieces of water between West and South; the most extensive, we think, must be the lake of Bolgodde; the evening sun shining bright on the water, made it very distinct. With the glass we could distinctly observe the fringing of the cocoa nut trees round the sea coast. I took a sketch of the scenery to the westward of the rest-house; the principal object, the fine rocky mountain called Oonadiya parawette, said to mean *hot-water mountain,* from a tradition that, formerly, a boiling spring existed on its summit, of which, however, there is no vestige now, the natives say, (for I do not know that the spot has ever been visited by Europeans,) and it does not seem very accessible. The scenery, though very fine to look at, is not picturesque; it exceeds the powers of the pencil: such *Pisgah* views cannot be represented on paper—the mountain rises abruptly before you, fronting the Peak, which, on turning to the eastward, presents itself in all its majesty, over-topping the surrounding mountains, which, at a distance, seemed to rival it in height.

2nd.—The coolies declaring at Palabatula that they could not carry our camp bedsteads any further, from the increasing difficulties of the road, we were obliged to content ourselves with our mattresses laid on the benches we found in the room; rather a hard bed I thought. We were here glad to have recourse to our blankets, at night, the thermometer being 64° when we went to bed, and 58° at six o'clock in the morning. Got up at seven, breakfasted, and by half-past nine were again fairly under way. From Diabetma there is an immediate and steep descent; but we soon began to mount again, the road getting from *very bad* to a *great deal worse,* until it must have become quite impassible, had not the smooth surface of the rock been cut horizontally and fashioned into steps, to the number of one hundred and twenty-seven. About half way up this *stair* there is a rude figure

traced on the rock, said, by the natives, to be the picture of the pious Rajé, who had the steps cut for the benefit of the pilgrims: the rock is called Darma Rajé Gal. Another descent brought us to the bed of the river Setagangula: here the pilgrims bathe, an act of purification before they approach the sacred mountain, the scenery and wood very fine. Got, on the banks of the river, a very curious species of *Impatiens*, growing to the size of a large shrub, a new *Pavetta* and a handsome yellow-flowered *Polygala*, constituting a small tree. A new species of *Oxalis* was likewise common on the rocks as we ascended from the river. I here walked, or, rather, to speak more correctly, scrambled with the help of a stick, and occasionally a man's hand, for a considerable distance. We had an intelligent native *vidan*, or headman, with us, who acted as my *bearer*, Col. W. finding it difficult enough to secure his own footing. This man pointed out every thing he considered worthy of notice; among others an immense perpendicular mass of rock, which he told us was called the Devil's Rock, in consequence of that terrific personage having frequently appeared on the top of it: it probably, in the rainy season, forms a magnificent cascade, as even now streams of water trickle over it in several places. The difficulties of the way continued to increase at every step, so that we were obliged to scramble over large stones; or rather detached masses of rock jumbled together, and heaped over each other in most chaste confusion. Sometimes our only footing was formed by the roots of trees from which the soil had been washed away; at others we found rude ladders of sticks, or branches tied together, by the help of which we managed to get over the larger masses of rock. We had one or two fine views of the real Peak, on our descent to the Setagangula; but about mid-day a thick fog came on, which continues to envelope *us* now that we are safely arrived on the top of the Peak; which we reached at half-past two, having been five hours and a quarter from Diabetma, a distance of three and a half miles. I dare say we spent, at least, an hour and a half in botanizing and amusing ourselves. Indeed, we should have occupied ourselves longer in this way, had we not feared the fog might draw to rain, which would have added considerably to our difficulties—but I made a sudden jump to the top of the Peak, from which I must again descend, and proceed upwards in the leisurely way we travelled. After about a mile of such road as I have described, we reached a flat open space, named Aramette-pane. Another mile brought us to Undeamalaterme, where there was formerly a small rest-house, now gone to ruin; which, I regret, as a day or two spent here, would, I am sure, afford the botanical traveller a rich treat. Here the base of the cone may be said to commence, and, we are told, the view of the Peak from hence is very fine; but, alas! we saw it not, *Sree Pada* was shrouded in his mantle of clouds, and invisible to us. We left our conveyances here, and proceeded on foot, through low stunted wood, covered with shaggy moss. For about half a mile the ascent is gradual; but from a place marked by a large white-washed stone, called Alahette, the cone rises almost perpendicularly; the face of the rock, in some places, being bare and smooth, would make the ascent almost impossible, from the insecurity of the footing, but for the long iron chains firmly fixed at the top, and hanging loose over the rock, by which the person ascending may secure himself. There is a series of four or five of these chains, the two last of which are very long and numerous, so as to afford assistance to many people ascending about the same time. Some of the more active of the natives, however, cling to the rock, with their bare feet, and ascend without touching the chains; but as this holy pilgrimage is undertaken by both sexes, and all ages, many could never accomplish it, without this aid. I confess I found the whole undertaking more arduous than I expected, from my recollection of my former journey to this place thirteen

years ago; but as the whole route, until you reach the perpendicular rise of the cone, is through the beds of mountain-torrents, it stands to reason that thirteen years wear and tear must have washed away much of the soil, leaving the rocks more prominent, and increasing the difficulty of the journey. Parts of the cone are covered with vegetation, long grass, an uncommon species of low *Bamboo*, with broad leaves, *Sium lobatum*, *Valeriana villosa*, *Cynoglossum decurrens*, and the beautiful crimson-flowered *Rhododendron arboreum*,[1] we found on the very summit. In the low wood, between Dia Undiamalalerme, and the rise of the cone, the variety of plants is endless, and their beauty most striking: those we particularly remarked were four different species of *Sonarila*, *Melastoma buxifolia*, *Chironia*, *Hedyotis*, *&c. &c.* Lower down, between Diabetma and Undiamalalerme, we found several most beautiful species of *Impatiens*, and other plants two numerous to mention. Finding ourselves completely in the clouds, and unable to distinguish any thing in the world below, I employed myself in fulfilling a promise I had made to write to the governor from hence, and continuing my journal. The circumference of the top of the Peak is about one hundred and eighty feet, surrounded by a wall of masonry, about four feet high, in which there are, I believe, three openings. We entered that towards the South; on this platform, as it may be called, rises a mass of rock, about eighteen or twenty feet in height, on the summit of which the temple over the impression of Boodhoo's foot is erected. The temple is of wood, and is firmly fixed to the rock by numbers of strong iron chains. The holy foot-mark impressed in the rock, is about five feet in length and three in breadth, or thereabouts; Boodh, when one foot rested on the Sree Pada, and left its impression there, stepped across to Makoona, situated, the priest gravely and seriously assured me, in *Siam*. There is a smaller temple, or shrine, placed lower down on the rock, where offerings are also made by the pilgrims, dedicated, I believe, to Samen; and also a kind of open belfry, in which two bells are suspended, and which our coolies, in turn, rung. Each stroke of the bell, we were told, commemorated a former visit; if so, some of them must have been from twenty to thirty times on the top of the Peak. I remarked, during our journey, that Sree Pada was always saluted by salaams, and sometimes prostrations, whenever it came in sight. We were accommodated for the night, in a hut, seven feet by five inside, in which we found two wooden benches; on them we placed our mattresses. One narrow leaf of our camp-table was placed against the wall, and between it and the bench we contrived to insert two chairs: these things our coolies brought up without any difficulty, and we had a most comfortable dinner of cold meat and *hot* curry and rice prepared in the priest's hut before mentioned: never was such luxury known on the top of the Peak before. About nine o'clock we again visited the summit of the rock, and found the mist clearing off in some directions, which, we hoped was the promise of favourable weather next day.

3rd.—At one A.M. we again ascended to the highest point—the mist was gone—the full moon shone bright—the scene was stupendous—the deep shadows making the hollows appear unfathomable, while the higher and more prominent features of the scene were illuminated by the mild and silvery lustre of a *tropical moon*, the most beautiful of all lights—of which none who have not seen it can form a conception: it was not nearly so cold as I had expected. After enjoying this magnificent moon-light view for a considerable time, we again betook ourselves to repose until the approach of day-break, when we resumed our elevated position to watch the rising sun. The morning was a little gloomy, and it was twenty minutes past six 'ere Phœbus surmounted the clouds on the eastern horizon, when he appeared in all his glory, imparting, as it were, life and animation to the scene which I shall not

[1] Probably *R. nobile*, Wall.

attempt to describe—no words would do it justice. But I must not omit mentioning what I considered the most remarkable and curious feature of the scene—the shadow of the Peak itself thrown an immense distance, reaching beyond the horizon, and plainly visible even on the sky, in form a perfect cone. The tract of country over which it fell, appeared, from the great height from which we viewed it, level to the sea; so that this enormous shadowy cone appeared as correct and perfect as if drawn by rule and compass: I never saw any thing more extraordinary or curious. We watched it gradually diminishing in length as the sun rose, for a long time, and then proceeded to take bearings, &c., and to ascertain the relative position of the most striking objects in view. On this elevated and isolated spot, the only noise we heard was the loud sound of rushing water, and the only living things we saw two butterflies. At the foot of the cone the rushing water is not heard. After breakfast I took a sketch of the temple, &c.[1] on the rock; and as the day began to overcast, and the clouds to threaten rain, we prepared, with regret, to leave a spot so remarkable, and which we shall, probably, never see again. Although this threatened change of weather was certainly far from desirable on some accounts, still it gave us the advantage of viewing the scene under almost every different aspect it could assume—by the serene and placid light of the moon—in the glorious and refulgent rays of an eastern sun—and in the threatened approach of storm and tempest which seemed to be gathering around us, the appearance of dense masses of cloud greatly below us, through which the rugged tops of some of the highest mountains appeared like islands in a tempestuous ocean, was wonderfully grand, and the descent of the Peak, (looking as we did to a fathomless abyss into which one false step might precipitate us,) not a little terrific. However, we got safely to the place where we had left our palankeens in an hour; Col. W. I believe, accomplished it in three quarters. Our party on the top of the Peak consisted, in all, of forty persons; thirty coolies, four servants, an orderly soldier of the Ceylon Rifles, a native head-man, and a Boodhist priest, with a boy, his attendant. We were obliged to leave some of our people in charge of things left at Diabetma, greatly to their disappointment, for all were anxious to visit this celebrated spot. I confess, I felt very glad to seat myself in my little vehicle again, for my knees were tottering under me. By the bribe of a bottle of arrack, at the end of a day's journey, the bearers undertook to carry me the whole way, which they, fortunately for me, accomplished. Soon after we started from Andeamalatenne, the threatened rain began to fall, and soon increased to a deluge; the rocks became so slippery that I expected every moment to be precipitated out of the palankeen by the coolies falling, which many of them did, but fortunately without injury to themselves or me, and we arrived safe and sound, though thoroughly drenched, at Diabetma, a quarter before three P.M.

[1] See Tab. I.

As we had necessarily deferred collecting plants till our return, the rain was a great annoyance, preventing our getting half of what we wanted, and rendering it difficult to preserve those we did gather. Much did I grieve at leaving so many beauties "to waste their sweetness on the desert air" which I had little chance of ever seeing again, as every different part of the island seems to be clothed with its own appropriate vegetation. In different regions, of equal height, we have observed plants of the same family, and even genus, to abound; but rarely of the same species. The various, curious and beautiful *Impatiens,* which we found principally between Diabetma and the foot of the cone of the Peak, differ, most decidedly, from the equally beautiful and curious species of the same genus, so numerous between Rambodde and Nervera Ellia, and in the neighbourhood of Maturatta. The *Acanthacæ* are also very numerous, and very various, from those we have found elsewhere; and the splendid *Sonarilas* we

have seen no where else; though there are several species in the neighbourhood of Nervera Ellia. The rain continued for the rest of the day, and we were obliged to content ourselves within the walls of our dismal abode—the only event of interest was killing a snake as it was making its way into the rest-house.

4th.—Left Diabetma at seven, the ground exceedingly wet and very slippery; reached Palabatula at a quarter past ten. While there, we were shown the frame which, during the season of pilgrimage to Sree Pada, is placed round the impression of the foot; it is said to be of silver gilt, embossed and set with precious stones; but looks to me very like brass, embellished with coloured glass.

Left Palabatula at two, and reached Galle-malle, at a quarter before four. This stage, although it appeared very bad in going, I considered a good road in returning: such is the effect of comparison. The rest-house too, I thought a wretched place in going; it now appears most comfortable—the situation is very good. On our journey to-day, the people have been much annoyed by leeches, which are always most active when the ground is wet. We did not see one on our way up. We were fortunate enough to escape rain; it had just ceased when we left Palabatula; recommenced immediately after our arrival here; and continued till dark. To show how little the natives think of this journey, which appears to us so arduous, I ought to mention a circumstance which occurred at Diabetma, where, after returning from the Peak, we missed our thermometer: upon consideration, I recollected Col. W. having given it to me while in the temple, on the top of the Peak, where it had hung during the night, and where we found the mercury at 54° at day-break. I also remembered having laid it down on the wooden frame which surrounds the temple, and supports the props of the roof. Our cook confirmed the hope we entertained of finding it, by saying, he had seen it there when he went to pay his last devoirs to the holy foot; but he did not touch it, as he thought we had left it there designedly (as an offering to Boodh, I suppose). Col. W. desired our appoo, (head servant) to offer a reward of two rix dollars (three shillings) to any one who would volunteer to bring it to us. Appoo, considering his master extravagant, only offered half the sum, and, for eighteen pence, a man readily offered to go next morning, and to rejoin us at Palabatula: he left Diabetma at six A.M. and delivered the thermometer to us at Palabatula by eleven, having gone from Diabetma to the very top of the Peak, and from thence down into Palabatula, in five hours, nearly a three days' journey *to us*.

5th.—After breakfast Col. W. went about a mile back on the road we travelled yesterday, to the place where the jungle ceases and the forest begins, for the purpose of collecting Ferns, of which there is an endless variety. During his absence I took a sketch of the surrounding scenery, which is very fine: he returned laden with specimens, and bitten by leeches. Among the loftiest trees we remarked in that forest were the *Horogaha, Dipterocarpus turbinatus*, which abounds, and over-tops the other trees. At ten o'clock set off on our return to Ratnapoora. When we got about half-way the day over-cast, and the rain fell in torrents, accompanied by loud thunder, and very vivid lightnings, which continued during the rest of our journey. The river, which our coolies had forded ankle deep, on our way to the Peak, was now a swollen torrent, impassible but in a boat: the ferryman not making his appearance, we were obliged to sit in the rain for, at least, a quarter of an hour. We reached Ratnapoora thoroughly drenched, between three and four, I believe; and found there, Capt. M'K—— and Mr. M———, so far on their way to the Peak, which they intended to cross, *ascending* from Suffragam, and *descending* on the Kandian side, which, we are told, is much less abrupt and rugged. But as there are no rest-houses, or huts of any kind on that route, travellers, in general, prefer encountering the difficulties of the road on the Suffra-

gam side, rather than running the risk of sleeping in the jungle, and, perhaps, being suddenly awoke by the approach of a *checta*, or wild elephant: the latter, we are told, are numerous in the jungle, on every side of the Peak, and traces of them are frequently seen a good way up the cone. We saw none, and it is rather remarkable that I have never met with one, although I have travelled a good deal in Ceylon, and through parts of the island where they are said to abound the most.

6*th*.—Remained at Ratnapoora.

7*th*.—At six in the morning embarked on the Cala-gunga for Caliura. About four miles below Ratnapoora, we landed to visit the great Suffragam temple, considered a place of much sanctity, and where the great Boodhist festivals are celebrated with almost as much parade as at Kandy: the *Peri-peri* was attended last year by upwards of 7,000 people. At half past four we reached Nambepané, where we landed, and slept.

8*th*.—Set off again about six A.M.; the morning foggy; the scenery uninteresting; the banks of the river covered with jungle to the water's edge, sometimes opening a little, and affording glimpses of low hills in the distance. There are three rapids which, when the current is strong, are sometimes difficult to pass; but they occasioned little delay or impediment to us. We remarked a considerable variety of birds, and a great many monkeys among the trees. It was quite dark before we reached Caltura, where we slept, and next day arrived at Colombo early in the evening, after an agreeable and interesting little tour, which we both enjoyed very much.

BOTANICAL INFORMATION.

If ever there was a period, when, more than at any other, a Journal was required which might give an account of the progress of Botanical Science, it is surely the present; when, thanks to the blessings of a long-continued and almost universal peace, there is scarcely a part of the world, of any extent, which has not lately been the field of some botanical discoveries. And this is eminently the case with the vast continent of the *New World*, which, in many of its finest provinces, had so long been the theatre of war and strife. North America, especially the United States, bids fair to have its botanical riches as well known and as faithfully described as many parts of Europe: and we are very happy to be able to announce that, our valued friend, Dr. Torrey, is preparing a "*Synopsis of North American Plants*," arranged according to the Natural method. It is a work that has been long called for, and it is fortunate for Science that the execution has fallen into such able hands. In this laborious employment Dr. Asa Gray lends his valuable assistance, a gentleman who has already deserved well of Science by the publication of his "*Specimens illustrative of the Grasses and Cyperaceæ of North America*," of which the first volume has recently appeared, in folio, containing one hundred species; and it may fairly be classed among the most beautiful and useful works of the kind that we are acquainted with. The specimens are remarkably well selected, skilfully prepared, critically studied, and carefully compared with those in the extensive and very authentic Herbarium of Dr. Torrey, which is especially rich in these two families. A second volume is, we believe, ere this, published[1] by the author, who has, moreover, collected materials for a work of a similar nature on the *Mosses of North America*, under the title of "*Muscologia Americana*."

Mr. Nuttall, who, though he appears to have resigned the Botanical Chair in the University of Harvard College, seems to be as ardently devoted to Natural History, and especially Botany, as ever. In the Transactions of the American Philosophical Society he has commenced his "*Collections towards a Flora of the Territory of Arkansas*," arranged according to the Natural Orders. This memoir will prove extremely

[1] This volume has, while this sheet is in the press, reached this country; and the two volumes are now on sale here, as well as in America.

interesting to the subscribers to Mr. Drummond's Collections; since many of them, especially from the interior of Texas, prove identical with Mr. Nuttall's discoveries in Arkansa: two countries not very remote from each other. Many new species are here described, and among the *Grasses* is a new genus, "GREENIA," dedicated, and most deservingly so, to B. D. Greene, Esq. of Boston, U. S.; but the "GREENEA" of Wight and Arnott, of the Order *Rubiaceæ*, published in the *Prodromus Floræ Peninsulæ Indiæ Orientalis*, has the right of priority. It is observed by Mr. Nuttall, that neither *Symplocarpus*, nor *Orontium* appear to the westward of the Alleghany mountains; and of the superb *Cyamus luteus, (Nelumbium luteum, Willd.,)* he remarks that, "the Osages and other western natives, employ the roots of this plant, which is of common occurrence, for food, preparing them by boiling. In form the tubers resemble those of the *Batata*, or *sweet potato*, and are traversed internally by from five to eight longitudinal cavities. They are found to the depth of twelve to eighteen inches beneath the surface of the earth, and are connected by means of running roots. The tubers arrive at maturity about the time that the seeds begin to ripen: before that period they abound with a milky juice, in common with the whole plant. When fully ripe, after considerable boiling, they become as farinaceous, agreeable, and wholesome a diet as the potato."

Two other valuable papers on American Botany are given by Mr. Nuttall, in the Seventh Volume of the Journal of the Academy of Natural Sciences of Philadelphia: the first entitled "*A Catalogue of a Collection of Plants; made chiefly in the Valleys of the Rocky Mountains or Northern Andes, towards the sources of the Columbia River, by Mr. N. B. Wyeth.*" The collection, Mr. Nuttall informs us, was made wholly on the returning route of this gentleman from the falls of the Columbia to the first navigable waters of the Missouri, when, pursuing the remainder of his route down the rapid current of that river, scarcely any further opportunity of adding to the Herbarium occurred. The number of the species, and their interest to the Botanist, will, therefore, be duly appreciated, and, particularly, when it is known that this was the first essay of the kind ever made by Mr. Wyeth; and yet I can safely say, that besides their number, (there being many duplicates,) they are the finest specimens, probably, that ever were brought from the distant and perilous regions of the West, by any *American* traveller." This collection is, indeed, an extremely important one, amounting to one hundred and thirteen species, the majority of which are described as new: many of them, however, will necessarily be found identical with the discoveries of Mr. Drummond, and, more particularly, of Mr. Douglas, in the same district of country. Perfect flowering specimens of *Lewisia rediviva* were obtained, and a figure is given of it; but, it is deeply to be regretted, without any analysis of the parts of fructification: for it is made to constitute a new order of plants under the Flat-head-Indian name of SPÆTHALUMEÆ, the root being the *Spætlum* of the *Sailish*, or Flat-head Indians.

It is, probably, the highly interesting character of this collection from the Rocky Mountains that has induced Mr. Nuttall himself to join an exploring party, and cross the continent of North America, to the shores of the Pacific, on the south side of the Columbia, than which a more interesting journey can scarcely be imagined. Of the particulars of the route, and the nature and success of the expedition he accompanied, I have been unable to learn any particulars, further than that a vessel sent round to meet them with stores, &c. had not arrived, on which account the party had suffered much inconvenience.

The second paper of Mr. Nuttall, in the Journal of the Academy of Natural Science of Philadelphia, just alluded to, is a "*description of some of the rarer or little known plants indigenous to the United States, from the dried specimens in the Herbarium of that Academy.*" These are chiefly from the Southern states, and

consist of eighty-three species, nearly the whole of which were previously undescribed: several of these are, however, likewise in Mr. Drummond's collections, and more may be expected from that indefatigable naturalist during his journeyings in Eastern Florida.

In our last mention of Mr. Drummond, (see *Bot. Misc. Second Series*, p. 184,) we spoke of his having left New Orleans, for *Texas*, a country recently claimed by the United States from the dominion of Mexico, but hitherto almost untrodden by the foot of a Botanist. No wonder, therefore, that it had attractions for Mr. Drummond, which were, perhaps, increased by the circumstance of a small collection of plants falling into his hands, which were gathered in that country by M. Berlandier, and which, at once showed how different, in general, was the vegetation from that of the United States. The particulars of his stay in Texas, will be given in the introductory notice to the remarks we shall have to offer on the plants themselves: suffice it to say, at present, that he has sent at three separate periods several chests of dried plants, of which the last, and by far the most interesting arrival, still remains to be distributed; and that he has, besides, enriched our gardens with seeds and roots of several new, or little known plants: among them are five species of *Cactus*, some handsome species of *Phlox*, a most remarkable new Cruciferous plant allied to the beautiful *Streptanthus, (Bot. Mag. t.* 3317,) and two kinds of *Pentstemon*, which, I think, may be reckoned, by very far, the handsomest of this very handsome genus: of these, one had been previously discovered by Mr. Nuttall, on the Red River, and called by that gentleman, on account of the great size and general appearance of the flower, *P. Cobæa;* the other and more beautiful one appears to be quite new. On his return to New Orleans in the latter end of the last year (1834), Mr. Drummond, immediately prepared for an expedition to Florida, and sailed for Apalachicola,[1] which he reached in January last: there he collected two boxes of specimens, which have reached Europe, when, finding from the peculiar nature of the country, surrounded by a widely extended waste of sand in almost every direction, that it was scarcely practicable to reach the southern extremity of Florida, except by the very circuitous route of the Havanna; he embarked for the island of Cuba on the 1st of February, and intended from thence, to reach *Key-west,* so as, on proceeding northward, to pass through the whole length of the southern peninsula of North America.

American Botany has sustained a great loss, and his adopted country a most invaluable member of society, in the death of *Dr. Schweinitz,* of Bethlehem, Pennsylvania, so well known for his accurate investigations of the Fungi: he lately became the possessor of Dr. Baldwin's extensive Herbarium of plants, chiefly collected in the southern states, and in South America, and had intended publishing some remarks upon them. For some years past his health had been declining, and early in last year he was carried off by a disease of the heart, an ossification, as it appeared, of the valves. His death was very sudden, and his collections have been bequeathed to the Academy of Sciences of Philadelphia, and is, together with the other valuable Herbaria belonging to that Institution under the able charge of Dr. Pickering.

Dr. Barratt, of Middleton, United States, America, has undertaken the difficult task of describing the North American *Willows*, a task to which, probably, no person is more competent. This gentleman has favoured us with a copy of his "*Conspectus of North American Willows,*" in MSS., in which he has enumerated one hundred

[1] This place, notwithstanding the unpromising appearance of the surrounding country afforded to our traveller some interesting plants, such as the *Cabbage Palm, Ceratiola ericoides, Mylocarium ligustrinum,* two curious *Pinguiculas,* the rare *Epidendrum conopseum,* growing on *Magnolia grandiflora,* the only epiphyte of the United States; a fine new *Andromeda,* a new *Cactus,* a *Sarracenia,* perhaps a variety of *S. variolaris,* with leaves a foot and a half long, *S. psittacina,* &c. &c.

kinds, (including a few varieties, and some European ones, that are cultivated as oziers, or otherwise,) arranged in nine natural groupes; and it gives us much pleasure to find that the collection made during Capt. Sir John Franklin's expedition, the whole of which, so far, at least, as the specimens would allow of it, he has been good enough to determine for us, has afforded several new species to the American Flora. Many of the North American species are eminently deserving of cultivation, on account of the beauty of their catkins and their foliage, particularly some of those from the North-west coast of America; and we confidently hope that Dr. Gairdner, who now resides at Fort Vancouver, and Mr. Tolmie, who is stationed in a most interesting spot, namely, at Fort M'Loughlin, in Millbank Sound, lat. 52° 6′ N., will enrich our collections with many novelties from that rich botanical field.

But it is impossible to revert to the Natural History of the Pacific side of North America, without recollections of a most painful kind. It is become the duty of one, who has, for a period of sixteen years, taken the most lively interest in the welfare of *Mr. David Douglas*, now to record the circumstance of his death—cut off in the prime of life, at Oahn, one of the Sandwich islands, by an accident, which has already been mentioned in the public prints; and this, at a period, when his friends were expecting to welcome his return to his native country, after an absence of many years which have been devoted, and with the most unexampled perseverance and success, to furthering the cause of Science in distant, and, previously, little explored countries. It was, indeed, intended by the writer of this brief notice, that *these very pages* should have contained some account of Mr. Douglas's adventures and discoveries during his two first voyages and travels; for the more satisfactory execution of which, the Horticultural Society of London, with a readiness and kindness, (for which he here begs to express his grateful acknowledgments,) had entrusted him with the whole of his journals in their possession. Any further notice of this lamented traveller and naturalist will now be necessarily deferred until the arrival of his Collections and MSS. which are daily expected by H.M.S. Challenger. Suffice it to say at this time, that Mr. Douglas's friends are under the greatest obligations to *R. T. Charlton, Esq.* H.B.M. Consul, at the Sandwich Islands, and *Chas. Ryde Rooke, Esq.* acting Consul in Mr. Charlton's absence, for the lively interest they have taken in the affairs of our unfortunate and deeply regretted countryman.

In the Second Series of the *Bot. Misc. vol.* 1. *p.* 176, we gave a brief notice of Mr. Mathews's indefatigable exertions in the cause of Peruvian Botany; and, we stated that, in the month of August, 1833, he was on the point of setting out for the interior of Huanuco, in the tenth degree of South latitude, where Ruiz and Pavon gathered so many of their interesting plants;[1] but this journey was, for a while,

[1] Nothing, however, could be more unfortunate than the first visit of these celebrated botanists. "Remaining at Huanuco," says the historian of Ruiz, "till the 10th of June, 1785, he departed again for the mountains of Chinchao, accompanied by two new disciples, one a botanist, named Don Juan Tafalla, the other a draughtsman, Don Francisco Pulgar. During his stay at Huanuco, he collected new materials in its vicinity with his accustomed zeal and perseverance. He proceeded to Chinchao, botanizing through Chulqui, and the Pampa de Ayubamba, Tambo de Paty, and in the Hacienda of Macora. Here he made a rich collection of vegetables and small birds, barks, gums, and resins, often losing himself in these dense woods, and as often suffering from the Mal del Mayco, a terrible disorder, which had already attacked him at Poyuzo, and which absolutely incapacitates the patient from any kind of labor. He had made enquiries to trace the origin of this severe malady, and ascertained that it was occasioned by the shade of two species of *Schinus*. On the 6th of August, he dispatched to Huanuco ten specimens of rare trees, that they might be forwarded to Lima, and from thence to Spain, and a packet of the coffee which he discovered in these mountains. Returning, however, to Macora, he found the place reduced to ashes. In this unfortunate conflagration were consumed all his manuscripts, books, provisions, clothes, moveables, herbarium, all the natural productions collected during the course of two months amidst these mountains, the diary of his Chilian travels for three years and a half, the botanical descriptions of four years, among which were those of six hundred plants observed in the preceding season, corrected subsequently by a comparison with living

interrupted by the revolutionary disturbances at Huananga and Canamarca, as well as by the country between it and Lima being for some time after infested by a band of miscreants, one hundred and twenty in number, who had recently broken loose from the island of San Lorenzo, and, for a time, almost kept the capital in a state of siege. At length, in November of that year, Mr. Mathews reached Casapi, on the banks of the river Huallaga, which empties itself into the Amazon, and situated in the Quebrada of Chinchao, in the Montana of Huanuco, where he gathered (between the time of his arrival and the 16th of March, 1835) three hundred and fifty species of plants, exclusive of Mosses, and where other kinds were then daily coming into flower. Cuchero, about six or eight miles distant, was for some time the head quarters of the celebrated botanist and traveller, Dr. Poeppig (the first volume of whose travels has just appeared); so that this collection may be expected to include many of the discoveries of that gentleman. So damp, however, was the climate, at that season, that Mr. Mathews was obliged to send his collections, which were very considerable, as quickly as possible to Lima, which place they reached in a very excellent state. The *Orchideæ*, he describes as numerous and beautiful; and of these, being furnished with an excellent microscope of Banks, he has made numerous drawings; very wisely reflecting, that in the recent state alone they may be satisfactorily figured.

On the 17th of April, 1834, our traveller left Casapi, and after four days' travelling, reached Juana del Rio, opposite the river Monson, passing on foot through dense forests, scrambling among rocks by the side of the river, with scarcely a vestige of a road (and, even this route is rendered impassible when the river is swollen); continuing down the river, in a canoe, he arrived at Juan Guerra, the port of Tarapota, near the junction of the Rio Myobamba with the Huallaga, on the 11th of May, after devoting a day to each of the Pueblas (where the Indians of the canoe were changed,) for the purpose of collecting plants. The scenery on the banks he states to be peculiarly magnificent; but the stream is not so easy of navigation as it has been described; so that it seems doubtful, if, as has been suggested, it could be navigated by steamboats, even of a small class. The Indians, who are extremely dexterous in the management of their canoes, are exposed to much risk, particularly in the descent, for the course is continually interrupted by rapids and *malpasos*. On both sides of the river is a continued succession of immense hills, (so that no where does the Cordillera come into view,) and in many places approaching so close to the water as to present almost perpendicular precipices many hundred feet in height, clothed with timber. Where these hills recede small plains are formed, when the river takes a serpentine course, forming numerous shallow branches with large islands, covered with the trunks of immense trees and mud, which are continually altering the channel. The principal trees on these flats are a species of *Cecropia*, and a strong cane, called, "*Canna brava*;" while, in places, when the surface becomes more elevated, these give place to Palms, and other lofty trees; but still it is some distance from the river, where they attain their greatest elevation.

In his letter, dated "Myobamba, (lat. 7° S.) Province of Minas, 30th June, 1834," he says, "The rivers here abound with fish, and the woods with birds, and other animals. In my way from Tara-

plants in Poyuza, and the ravine of Chinchan, the works of Linnæus, Murray, Plumier, Jacquin, and other botanists, the presses, field-tents, drying-paper, provisions for two months, with many pieces of plate. He would, probably, himself have perished, in his eagerness to save the fruits of his labors, had he not been dragged out of the flames by two of his servants." See the *Historical Eulogium on Don Hippolitos Ruiz Lopez, translated from the Spanish by A. B. Lambert, Esq.* On an after-occasion, however, Ruiz and his companions exerted themselves, as much as possible, in the neighbourhood of Huanuco, to repair the heavy loss in objects of Natural History occasioned by the conflagration of Macora.

pota to this place, distant 35 leagues, with roads the most wretched and fatiguing imaginable, (in many places rendered almost impassible by the continual rains, and the falling of trees,) I had reckoned upon a vegetation considerably different from that near the river, and I was not disappointed. The trees of the vallies are, indeed, similar; but the plants on the hills, and near this city, are entirely distinct from anything I have before seen in Peru. The surface being generally rocky and sandy, the trees are small, and admit the growth of much under-wood; small shrubs, particularly of *Melastoma*, are numerous; and there are besides large open tracts of pasture (or *pajonal*). *Orchideæ* are few in number; and *Mosses* and *Ferns* are of still less frequent occurrence. My collection, since I left Casapi, in plants, animals, insects, and shells, is considerable. I shall leave this in about a fortnight, for Chacapoyas, (situated upon another of the tributaries of the Amazon,) where I intend to stay five or six weeks, if the season prove favorable; and, that place being within the limits of the Cordillera, (but with constant rains,) I have no doubt that I shall find many plants which are not met with to the southward: and immediately on my arrival at the coast, I shall forward every thing I have collected to England."

All this has been happily accomplished, and in the middle of April this year (1835) I had the pleasure of receiving letters from Mr. Mathews, dated Lima, Nov. 30th, 1834, in which he briefly mentions his journey to Chacapoyas, thence to Truxillo upon the coast, and so to Lima, where he arrived on the 10th of Nov., after an arduous and most successful journey. Chacapoyas proved an eminently favorable station, particularly for alpine plants; so that he was detained two months there :—and the result of this expedition, in Botany alone, has been a collection of upwards of ten thousand specimens, including nine hundred species. Of these, nearly one half has already arrived in England. They are in beautiful condition, all numbered and accompanied by a list[1] of stations, and cannot fail to give the greatest satisfaction to the friends of Mr. Mathews, and to reflect the highest credit upon Mr. Mathews himself. This part of the collection is peculiarly rich in *Compositæ*, (many of great beauty) *Melastomaceæ*, (of which he has gathered nearly fifty kinds.) There are several *Andromedas*, *Fuchsias*, *Rubiaceæ*, two *Proteaceæ*, several *Lauruses*, *Weinmannias*, *Befarias*, *&c. &c.*

Since the arrival of these, another letter has arrived, dated Lima, 20th of Jan. 1835, announcing the departure, (at the same time with the letter,) of the rest of these valuable collections; so that their appearance is daily looked for; and I feel confident that they will prove equally interesting with those just noticed.

No sooner were these dispatched, than with all the ardour and perseverance which so eminently characterize this naturalist, Mr. Mathews set out on another and more extended journey to the eastern side of the Cordillera. From Chacapoyas, his first station, he has the intention of proceeding, by San Jaen de Bracamoros, to Loxa, for the purpose of gathering the *Cinchonas*; after which he will determine upon the exact route he will take; but under no circumstances does he expect to return to Lima in less than a twelvemonth, or a year and a half.

BOHLER'S BRITISH LICHENS.

It is with much pleasure we announce the appearance of the first Number of *Bohler's Lichenes Britannici*, published by G. Ridge, Sheffield, consisting of *specimens*, accompanied by generic and specific characters, synonyms, localities, and occasional remarks. Coloured figures are substituted where the specimens are of that nature as not readily to admit of their introduction; or, in those cases where, from

[1] At least this is the case with my set. Should it not be so with the other subscribers, which the labour of preparing so many lists renders very probable, I shall gladly publish my list of numbers and stations, for the benefit of others.

the extreme rarity of the species, it is not possible to procure a sufficient supply of specimens: so that the whole will form a work admirably illustrative of the British individuals of this extensive and beautiful family of plants. The species given in the first Fasciculus, or Number, are, *Endocarpon miniatum, Squamaria crassa, Squamaria murorum* (plate), *Solorina saccata, Sphærophoron coralloides, Cladonia rangiferina, Scyphophorus gracilis, Scyphophorus filiformis.* The plate is extremely well executed, both as to drawing and colouring, and the specimens are prepared with much care and neatness: so that we trust this useful publication will meet with the encouragement it deserves.

GARDENER'S BRITISH MOSSES.

Mr. Gardener, of Glasgow, has, for a long time, been engaged in collecting specimens of British Mosses, with the view to the preparation of a work to be entitled "*Musci Britannici,*" on a similar plan to that of the beautiful "*Deutschlands Moose,*" &c. (or *Pocket Herbarium of German Mosses,*) of H. C. Funck; and the author considers his collections now to be sufficiently numerous to warrant him to commence the undertaking, and to solicit the names of subscribers. By the plan he has adopted, a neat pocket volume is capable of containing a full set of British species. Each page is marked out in compartments suited to the size of the respective species, in their proper order, and the generic and specific names are written in lithography, precisely according with the arrangement of this tribe of plants in Dr. Hooker's *British Flora.* As, however, every set must, of necessity, be deficient in specimens of several species, from the difficulty of procuring some, and the impossibility of obtaining others, the price of the copy will vary according to the number of species it may contain; each species being reckoned at the moderate sum of 3*d.* It is calculated, upon the average, that each copy may contain from one hundred and fifty to one hundred and eighty species; and, as the author will spare no exertions to increase his store of species, he trusts to be able, from time to time, to offer specimens to his subscribers, which may enable them to fill up many of their blank compartments. With a view to further this object, he will thankfully offer rare Mosses which are peculiar to Scotland, for those which are confined to the more southern parts of Great Britain: a system of exchange which may be of mutual advantage. Dr. Hooker will be happy to be the medium of communication between Mr. Gardener and any Muscological friend.

ILLUSTRATIONS OF INDIAN BOTANY.

By Dr. Wight & G. A.W. Arnott, Esq.—TAB. II.

ABUTILON GRAVEOLENS.

Ramis pubescentibus pilisque mollibus sparsis horizontalibus tectis, foliis rotundo-cordatis breviter ac repente acuminatis dentatis utrinque velutinis, pedicellis petiolum subæquantibus sub flore articulatis, laciniis calycinis ovatis acuminatis, corolla demum reflexa, capsula hirsuta truncata calycem paullo superante, carpellis 25—30 acutis exaristatis.

Abutilon graveolens. *Wight et Arn. Prod. Fl. Penins. Ind. Or. v.* 1. *p.* 56. *Wight, Cat. n.* 191.

Sida graveolens. *Roxb. Hort. Bengh. p.* 50; *Fl. Ind. v.* 3. *p.* 179; *in Cœt. Merc. Angl. Ind. Or. Mus. tab.* 1492. *De Cand. Prod. v.* 1. *p.* 473. *Spr. Syst. Veg. v.* 3. *p.* 118. *Wall. List. n.* 1856.

Sida tomentosa. *Wall. List. n.* 1852. B. (quoad spec. e Gonga-chora)—Abutilon hirsutum, &c. *Rumph. Herb. Amb.* 4. *p.* 29. (descr. bona), *t.* 10 (haud bona).

Herbaceous, erect, branched, everywhere clothed with clammy pubescence. *Stems* clothed with much soft pubescence, mixed with longer, but also soft hairs. *Leaves* alternate, roundish-cordate, occasionally slightly lobed, 5—7-nerved, repandly-toothed, very various in size, being from one and a half, or two inches, to a

foot in diameter. *Petioles* about as long as the leaves. *Stipules* linear, recurved, acute. *Peduncles* axillary, solitary, one-flowered, scarcely so long as the petioles, jointed a little below the calyx. *Calyx*, five-cleft, persistent, without any involucel: segments ovate, with a rather long acumination, with a nerve along the middle. *Corolla* yellow, dark purple at the bottom, rotate; limb at length recurved or even reflexed; petals broadly obovate, or slightly obcordate, twisted in æstivation. *Stamens* numerous, united below into a tube, free in their upper half. *Anthers* reniform, one-celled. *Ovary* 25—30-celled, with three ovules in each cell. *Styles* 25—30, united in their lower half, free, and spreading above, filiform. *Stigma* capitate. *Capsule* hairy, composed of 25—30. *Carpels* or *cocci*, truncated, each carpel a little acute but not awned, two-valved, splitting elastically, containing three seeds.

It is probable that this, *A. hirtum*, G. Don, (*Sida hirta*, Lam.) *A. Asiaticum*, G. Don, (*Sida Asiatica*, Linn.,) and *A. Indica*, G. Don, (*Sida Indica*, Linn.,) may prove, on further examination, to be mere varieties of one and the same species: they seem, indeed, to pass, by insensible gradations, into each other. *W. and A.*

NOTICE CONCERNING MR. DRUMMOND'S COLLECTIONS MADE CHIEFLY IN THE SOUTHERN AND WESTERN PARTS OF THE UNITED STATES.

(*Continued from Botanical Journal, vol.* 1. *p.* 202.)

LEGUMINOSÆ. *Juss.*

185. Baptisia *uniflora*; subpubescens, foliis subsessilibus, foliolis obovato-lanceolatis retusis subcoriaceis reticulatis, stipulis minutissimis subulatis, floribus axillaribus solitariis breviter pedunculatis summis subracemosis, calyce germineque fulvo-villosis, legumine ovato-globoso acuminato crasso. *Nutt. Gen. Am.—Podalyria uniflora, Mich. Am. v.* 1. *p.* 263.—*Baptisia lanceolata, Ell. D C.*—Covington, Louisiana.—This is a very interesting, and, probably, a rare plant; which, I think, is certainly the *Podalyria uniflora*, Mich. and also, the *Sophora lanceolata*, Walt.: but if so, the name is very inappropriate. The Covington specimens are only in fruit, and their fruit is almost globose, of a very thick and very coriaceous texture, with about two small seeds. I have flowering specimens of the same species from Mr. Nuttall, gathered in the Arkansas, and marked *Podalyria villosa;* but that plant has decidedly racemose flowers, and appears to be what I possess from the late Mr. Schweinitz, as "*B. pubescens, n. sp.: aff. B. tinct. of L.*" from Georgia. This is very downy all over.

186. Baptisia *australis*, Br.—*Sophora australis, Sims, Bot. Mag. p.* 509.—*Podalyria australis, Vent.—P. cærulea, Pursh.*—Alleghanies.—This beautiful species is plentiful by the banks of rivers and water-courses in Kentucky, where it is known by the name of "*Wild Indigo*," and whence I have beautiful specimens from Dr. Short and Mr. Griswold.

187. Baptisia *alba*. Br. De Cand.—*Podalyria alba, Sims Bot. Mag. p.* 1177. —N. Orl. (*n.* 74 *bis.*)

Obs. The *Baptisia leucophæa*, Nutt. does not appear to have been found by Mr. Drummond, in Louisiana; but he has gathered it abundantly in Texas, and Mr. Greene finds it in Carolina.

Obs. 2. The beautiful *Virgilia lutea*, of this division of *Leguminosæ*, I have received, both in flower and fruit, from my valued correspondents, Dr. Short and Mr. Griswold, who find it only on calcareous cliffs of the Kentucky river, bearing flowers early in May, and fruit the middle of August.

188. Crotalaria *ovalis*, Pursh. *Hook. in Bot. Mag. t.* 3006.—N. Orl. (*n.* 77.)

189. Crotalaria *sagittalis*, Linn. (*var.* α.) —N. Orl. (*n.* 76.)

190. Crotalaria *parviflora*, Roth.—*C. sagittalis, var. linearis. Mich.*—N. Orl. (*n.* 75.)—This seems to me only to differ from *C. sagittalis* in the longer and narrower leaves. Both have perennial, or, at least, biennial roots, as is evident from my specimens.

(Crotalaria *retusa*.—This is in the collection from Covington; but, as expressed by Mr. Drummond, derived from a garden.)

191. Medicago *lupulina*, L.—N. Orl. (*n.* 78.)

192. Medicago *maculata*, Willd.—N. Orl. (*n.* 80).

193. Medicago *denticulata,* Willd.—N. Orl. (*n.* 79.)

194. Melilotus *parviflora,* Desf.—N. Orl. (*n.* 81.)

195. Trifolium *umbellatum,* Sw. *in De Cand. Prodr. v.* 2. *p.* 199.—N. Orl. (*n.* 91.)

Obs. I possess the *T. repens,* from Louisiana, gathered by Mr. Tainturier, and, from Lexington, by Dr. Short; the *T. arvense* also, from the former country. Dr. Short sends two very handsome *Trefoils* from Kentucky, both known under the name of "*Buffalo Clover;*" the one *T. reflexum,* Linn. and De Cand. *Prodr. v.* 2. *p.* 201. *n.* 90. (not *T. reflexum.* Waldst. et Kit. De Cand. *Prodr. v.* 2. *p.* 197. *n.* 61.) and the other *T. stoloniferum,* of Muhl., whose heads of flowers are quite equal in size with those of the *reflexum;* but which is altogether a very different species; it may be thus characterized: *T. stoloniferum;* caulibus repentibus diffusis, foliolis latissime obcordatis denticulatis, stipulis magnis ovato-lanceolatis membranaceis, capitulis axillaribus longissime pedunculatis, floribus pedicellatis post anthesin deflexis, calycis obscure striati laciniis subulatis æqualibus vexillo dimidio brevioribus, leguminibus oblongis acutis marginatis compressis dispermis.—Its nearest affinity is with *T. repens;* but it is three or four times as large in all its parts. Colour of the flowers apparently white.

196. Psoralea *eglandulosa,* Ell.—*Melilotus psoralioides. Nutt.*—N. Orl. (*n.* 83.)

197. Indigofera *tinctoria.* Walt.—Jacksonville: perhaps cultivated.—It is very different from *I. Caroliniana,* which I possess from N. Carolina.

198. Clitoria *Mariana,* L.—Covington.

199. Clitoria *Virginiana,* L. Covington. —As it appears to me, Mr. Nuttall mistakes the *C. Mariana* for the *Virginiana,* and *vice versa:* for he says of the former that, "the calyx is tubular-campanulate, five-cleft, much longer than the bracteas," which is the character of *C. Virginiana,* L.; and of the latter he says, "it has the largest papilionaceous flowers in the United States;" but our *C. Mariana* has the larger flowers of the two.

200. Galactia *pilosa,* Nutt. *Gen. Am. v.* 2. *p.* 116.—Covington.

201. Glycine *stricta;* caule erecto gracili tereti foliisque trifoliolatis glabris, foliolis oblongis obtusissimis subtus glaucis longitudine petioli, umbellis sessilibus axillaribus brevissimis, calycibus pedicellisque hirsutis.—Covington.—I can find no description to accord with this plant, which has a perennial, somewhat fusiform and woody root. *Stem* a foot to a foot and a half high, slender, zigzag, rounded, glabrous. *Leaves* remote. *Petiole* one and a half to two inches long, slender, glabrous, bearing three oblong, obtuse, glabrous leaflets, about equal to them in length. *Flowers* four to six, or eight together, axillary, forming a kind of short, sessile umbel. *Pedicels* three to four lines long, hairy, bracteated at the base. *Calyx* hairy, bibracteate, cut half way down into five nearly equal, subulate, hairy segments, rather more than half the length of the corolla. *Vexillum* broad. *Carina* obtuse. *Stamens* diadelphous. *Germen* linear-oblong, thickly clothed with white hairs. The fruit I have not seen.

202. Petalostemon *candidum,* Mich.—St. Louis.

203. Petalostemon *violaceum,* Mich.—St. Louis.

204. Dalea *alopecuroides,* Nutt.—St. Louis.

205. Tephrosia *Virginiana,* Pers.—*Galega,* L.—St. Louis. Covington.

206. Tephrosia *hispidula,* Nutt.—N. Orl. (*n.* 84.)

207. Tephrosia *paucifolia,* Nutt.?—*Ell. Carol. v.* 2. *p.* 246.—*Galega villosa.* Mich. (*non. L.*)—N. Orl. (*n.* 85.)—Our specimens agree with the description of Mr. Nuttall, and with Carolina specimens from Mr. Elliott, and others from Alabama, sent by Dr. Torry; but not with the plant I have received from Mr. Nuttall, from the Arkansas, marked "*Tephrosia cinerea,* Jacq., *T. paucifolia,* Nutt. Gen." which has more numerous leaflets, a much longer raceme, with numerous and almost spicate flowers, probably the *Galega spicata* of Walter. This plant I have from Texas: it is quite different from the *Galega cinerea* of Jacq. Ic.

208. Amorpha *fruticosa,* L.—N. Orl. (*n.* 86.)

209. Glottidium *Floridanum,* D C.—*Robinia vesicaria. Jacq. Ic. Rar. v.* 1. *t.* 148.—*Œschynomene platycarpa. Mich. Sesbania disperma. Mich.*—N. Orl. 1833.—Specimens in fruit only occur in the Herbarium; but it is readily distinguished by the curious structure of the legumes.

210. Zornia *tetraphylla,* Mich.—Covington.

211. Stylosanthes *elatior,* Sw.—N. Orl. (*n.* 87.)

212. Desmodium *Canadense,* De Cand.

var. hirsuta.—St. Louis.—This, if it be not a distinct species, as Dr. Boott suspects, is a very remarkable variety of *D. Canadense,* having the stem and branches clothed with copious, patent hairs.

213. Desmodium *scaberrimum,* Ell. *Carol. v. 2. p. 217. ex descr.—Hedysarum viridiflorum, Pursh, fide specim. in Herb. Linn.—Voltz, Herb.—Mich.? ex descr. Darl. Fl. Cestr. fide specim. (Boott.)*—It is not the *H. viridifl.* of Linn. Dr. Boott prefers retaining Elliott's name.—St. Louis.

214. Desmodium *Marylandicum,* De Cand.—*Hedys. obtusum. Pursh, Willd.? Torrey in Hook. Herb.*—Jacksonville. St. Louis.

215. Desmodium *ciliosum, Willd. Nutt.* (*sub Hedys.*)—Jacksonville.

216. Desmodium *viridiflorum,* Gron. et Linn. (*sub Hedys.*)—Jacksonville.

217. Desmodium *cuspidatum,* Willd. (*sub Hedys.*) *D. bracteosum β. De Cand.*—Jacksonville. St. Louis.—Dr. Boott suspects that the *H. bracteosum,* Mich. is *H. lævigatum* of Nutt.

218. Desmodium *glabellum,* Mich. (*sub Hedys.*)—Jacksonville.

219. Desmodium *paniculatum,* Linn. (*sub Hedys.*)—St. Louis. Jacksonville.

220. Desmodium *strictum,* Pursh, (*sub Hedys.*)—Jacksonville.—This is *Hed. paniculatum, Herb. Hort. Reg. Paris.* (Boott.)

221. Desmodium *acuminatum.* Mich. (*sub Hedys.*) N. Orl.—St. Louis.

222. Desmodium *nudiflorum.* Linn. (*sub Hedys.*)—Covington.—This species is found in the Himala Mountains by Mr. Royle.

223. Desmodium *pauciflorum.* Nutt. (*sub Hedys.*)—N. Orl. (*n.* 88.)—This species seems to have been long overlooked. Dr. Boott has lately received it from West Chester, as I have also from Pittsburg, gathered by Voltz, and from Canada, by Mr. Goldie.

224. Desmodium *lineatum,* Mich. (*sub Hedys.*)—Jacksonville.—Dr. Boott, who kindly undertook to examine and name all my North American *Desmodia,* remarked on this "*rarissimum,* De Lessert gave me three leaves from a specimen of Michaux, in Bosc's Herbarium."

225. Lespideza *reticulata,* Willd. (*sub Hedys.*) *L. sessiliflora, var. "foliis sublinearibus. Mich.—L. angustifolia. Darl. Fl. Cestr.—L. divergens. Bigel. Fl. Bost."*—Jacksonville.

226. Lespideza *Stuvei,* Nutt. (*fide specim. in Herb. Hook. ex Boott.*)—Jacksonville, under two forms, in the one state, more procumbent than the other; and that state is marked by Dr. Boott as "*L. virgata, Nutt. MSS.*"

227. Lespideza *capitata,* Mich. *Hedys. fructescens L.*—Jacksonville.—*β. sericea;* foliolis angustioribus sericeo-nitentibus.—Jacksonville.—*γ. angustifolia,* Pursh, D C.; foliolis linearibus.—*L. angustifolia, Ell.*

228. Lespideza *hirta,* Willd. (sub *Hedys.*)—*L. polystachya.* Mich.—Jacksonville.

229. Lespideza *violacea,* L. (*sub Hedys. fide Herb. Linn.*)—*Hedys. divergens. Willd.—Hedys.* L. fide specim. *Clayt. in Herb. Gronov. (nec aliorum.)*—Jacksonville (in fruit only).

230. Lespideza *prostrata,* Willd. (*sub Hedys.*)—Jacksonville. N. Orl. (*n.* 89.) Covington.—Dr. Boott distinguished this species from *L. procumbens,* by its being more delicate, glabrous; by having smaller, obovate, elliptical leaves, and very short petioles.

231. Vicia *Caroliniana,* Walt.—*V. pauciflora, Mich.*—Alleghanies.

232. Vicia *Cracca?*—L. *var. pauciflora, minor.*—N. Orl. (*n.* 90.) *var. pauciflora, major.*—N. Orl. (*n.* 90. *bis*).—In the first var. the flowers are often reduced to two upon a peduncle, and these flowers are small.

233. Amphicarpæa *monoica,* Ell.—Jacksonville. St. Louis.—*β.* caule foliisque fulvescenti-sericeis, floribus numerosis.—St. Louis.—Dr. Short finds that these plants which bear the subterranean fruit, do not run over other plants, but lie flat on the ground. In our *β,* the flowers are more numerous than in *α,* larger, and much more purple. The leaves are almost tomentoso-sericeous.

234. Rhynchosia *reniformis,* D C.—*Arcyphyllum simplicifolium. Ell.—Glycine tomentosa, monophylla. Mich.*—N. Orl. (*n.* 91.)

235. Rhynchosia *erecta.* D C.—*Arcyphyllum erectum. Ell.—Glycine erecta. Nutt.?—G. tomentosa, erecta. Mich.*—Covington.—An *Glycine tomentosa? Nutt.*—Our plant differs from the *erecta* of Nutt. in having the racemes always shorter than the leaves.

236. Rhynchosia *tomentosa,* Hook. et Arn.—*Glycine tomentosa. Linn. Mich. (excl. α. β. γ.) Ell.—Dill. Hort. Elth. t.* 26. *f.* 29.—N. Orl. (*n.* 92.) Covington.—An *Glycine erecta? Nutt.*—This is a far less erect-growing plant than the preceding, with broader obovato-rotundate,

obtuse leaves. Our plant is the true *Glycine tomentosa* of Linn. according to *Hort. Elth.* above quoted.

237. Apios *tuberosa*, Mœnch.—St. Louis. Covington.

238. Wisteria *frutescens*, D C.—N. Orl. (*n.* 93.)

239. Phaseolus *perennis*, Walt.—Jacksonville.

240. Phaseolus *diversifolius*, Pers. D C. —*P. trilobus. Mich.—Strophostyles angulosa. Ell.—Dolichos trilobus. Nutt.* (*not Linn. which is an East Indian species.* N. Orl. (1833.)

241. Phaseolus *Helvolus*, L.—St. Louis. —β. *angustifolio.* St. Louis. Covington. —The leaves of this plant are certainly exceedingly variable, and sometimes a little sinuated, when it seems to pass into the *P. diversifolius;* and the figure of Dillenius referred to by Linnæus, *Hort. Elth. t.* 233. *f.* 300, better represents the preceding species than the present. May not these, and *P. vexillatus* of the United States, be mere varieties of the same species? In regard to the Dillenian plant referred to as the *P. vexillatus* of Linn. and that of Jacq. they are a tropical species, and I have never seen anything resembling them from the United States.

242. Vigna *glabra*, Savi.—*Dolichos luteolus. Jacq.*—Covington.

243. Lupinus *perennis*, L.—Pennsylvania. —(Lupinus *villosus*, the most beautiful, perhaps, of all the species, although not sent by Mr. Drummond, I have received from the Mississippi, gathered by M. Tainturier.)

244. Erythrina *herbacea*, L.—Covington. N. Orl. (*n.* 94.)

245. Schrankia *uncinata*, Willd.—N. Orl. (*n.* 95) and 1833.

(Darlingtonia *glandulosa*, D C.— This plant I possess from the Mississippi, gathered by Tainturier; but it scarcely appears to me to differ from the northern species, *D. brachyloba*, which I received from Dr. Darlington himself.)

246. Acacia *Farnesiana*, Willd. *Nutt. Gen. Am.*—N. Orl. (*n.* 95 *bis.*)

247. Acacia *lutea*, Sill. Am. Journ. v. 7. p. 61.—N. Orl. 1833.—Leaves only: but I possess flowering specimens from M. Tainturier gathered on the Mississippi.

248. Arachis *hypogæa*, L. Covington. (*cultivated.*)

249. Cassia *Tora*, L.—St. Louis. Covington.

250. Cassia *occidentalis*, L. — N. Orl. 1833.

251. Cassia *nictitans*, L.—Covington.

252. Cassia *Chamæcrista*, L.—Covington.

253. Cercis *Canadensis*, L.—N. Orl. 1833.

ROSACEÆ. *Juss.*

254. Persica *vulgaris.* Mill.—N. Orl. (*n.* 102 *bis.*)

255. Cerasus *borealis*, Mich.—Alleghanies.

256. Cerasus *Americana, Prunus Americana. Darl. Fl. Cestr. p.* 61.—N. Orl. (*n.* 98. Leaves only.)—The leaves of this are singularly veiny and downy beneath. They agree with specimens of *Prunus Americana* I have received from Dr. Torrey.

257. Cerasus *nigra*, Sois. (*Prunus nigra*, Ait.)—St. Louis. Leaves only.

258. Cerasus *Chicasa*, Mich.—N. Orl. 1833. In leaf only.—This Mr. Drummond sends us as the "*Chicasa Plum*," cultivated about New Orleans. I have reason to think, from the peculiarity of the bark, that those flowering specimens marked "*N. Orl. n.* 102 *bis*," with spinous branches and glossy red-brown bark, belong also to the same species. Those flowering specimens marked "*N. Orl. n.* 102 *bis*, γ." with larger flowers, stouter branches, and greyer bark, agree better with my specimens of *C. Chicasa* from S. Carolina. Those marked "*n.* 102 *bis*, α." (in flower likewise), seem almost intermediate.

259.—Cerasus *serotina*, Lois.—N. Orl. (*n.* 96.)—Alleghanies.

260. Spiræa *opulifolia*, L.—St. Louis.

261. Spiræa *Aruncus*, L.—St. Louis.— Dr. Short observes, "This is distinctly and constantly *diœcious*. I have never seen the *var. Americana*, of Pursh, which, he says, has hermaphrodite flowers."

262. Gillenia *trifoliata*, Mœnch.—Alleghanies.

263. Agrimonia *suaveolens*, Pursh.— Covington.

264. Agrimonia *parviflora*, Ait.—St. Louis.

265. Geum *album*, Gmel.—Ohio. N. Orl. (*n.* 99.)

Obs. The *Stylopus vernus* of Raf. is a very curious plant; but it scarcely differs from *Geum*, except in having a very distinct support to the head of carpels. I possess beautiful specimens from Dr. Short.

266. Comaropsis *fragarioides*, D C.— Alleghanies.

267. Rubus *flagellaris*, Willd.—N. Orl. (*n.* 101.)—β. subtus pubescentibus.—N. Orl. (*n.* 102.)—All the specimens have

ternate leaves. Specimens of a *Rubus*, sent in 1833, from N. Orl., with remarkably long unbranched sarmenta; some with flowers, and scarcely any or only very young leaves; others, with ternate leaves, appear to be another variety.

268. Rubus *trivialis*, Mich. vix alior.—α. aculeis validis, setis numerosis.—N. Orl. (*n.* 100.)—β. setis nullis, aculeis validis.—Another state, probably, of this plant, in leaf only, with strong, recurved aculei, without setæ, and constantly quinate leaves, is sent from N. Orl. in 1833.—γ. setis aculeisque paucioribus.—Alleghanies.—These *may* be three distinct species: the latter is what I receive from the northern states as *R. trivialis*.

269. Rubus *odoratus*, L.—Alleghanies.

270. Fragaria *Virginica*, L.—N. Orl. In leaf only.

271. Potentilla *Canadensis*, L.—Pennsylvania.

272. Potentilla *supina*, L.—St. Louis.

273. Rosa *rubifolia*, Ait.—The same fine, and rare, and most distinct species I possess also from Dr. Short, gathered in Kentucky.

274. Rosa *Carolina*, L.—Ohio.

275. Rosa *parviflora*, Ehrh.—N. Orl. 1833.

276. Cratægus *Crus Galli*, L.—Alleghanies. (Flower and young fruit.)—St. Louis. (Foliage only.)

277. Cratægus *opaca* (Hook. et Arn.); foliis oblongis obtusis basi attenuatis subsinuatis obscure serratis supra glabris opacis subtus pallidioribus nervis ferrugineo-pubescentibus, fructu 5-loculari.—N. Orl. (*n.* 104.)—This is unfortunately destitute of flower; but the fruit is present, and this is as large as that of our *C. oxyacantha*, marked in the dry state with five furrows, (alternating with the cells,) and crowned with the triangular segments of the calyx. It appears quite distinct from any species we are acquainted with.

278. Cratægus *parvifolia*, Ait.—St. Louis.

279. Cratægus *punctata*, Ait.—St. Louis, (in fr.)—N. Orl. (*n.* 103, in fl. foliis angustioribus, and 103? bis fr.)—Covington. (Foliage.) Alleghanies.

280. Cratægus *coccinea*, L.—Pennsylvania. Alleghanies.

281. Cratægus *glandulosa*, Willd.—Alleghanies.

282. Cratægus *spathulata*, Mich.—N. Orl. (*n.* 105.) and 1833.—In both cases with foliage only, which is most variable. Upon the specimens of 1833, Mr. Drummond remarks, that the "fruit is said to be as large as a musket ball, and of a blue colour."

283. Cratægus *apiifolia*, Mich.—N. Orl. (*n.* 105, *bis.*)

284. Pyrus *coronaria*, L.—Alleghanies. N. Orl. (*n.* 104, *bis.*)

285. Pyrus *angustifolia*, Ait.—N. Orl. 1833.

286. Pyrus *arbutifolia*, L.–Pennsylvania. var *macrophylla*.—N. Orl. 1833. Covington.

287. Pyrus *melanocarpa*, Willd.—Pennsylvania.

CALYCANTHEÆ. *Lindl.*

288. Calycanthus *lævigatus*, Willd.—Pennsylvania.

289. Calycanthus *glaucus*. Willd.—Pennsylvania (*perhaps cultivated*).

ONAGRARIÆ. *Juss.*

290. Epilobium *coloratum*, *Muhl.*—St. Louis.

Obs. There are, in the northern states, two varieties of *Epilobium angustifolium*: one with very large flowers like those of our European plant, and one with longer spikes and flowers, more numerous, and not half so large. Of this I have fine specimens from West Chester, and it has been long cultivated in the Glasgow Botanic Garden, where it retains its character after many years.

291. Œnothera *biennis*, L.—Covington. Jacksonville.

292. Œnothera *sinuata*, Mich.—Hook. in Bot. Mag. t. 3392.—N. Orl. (*n.* 107, α. —*var.* foliis subintegris *n.* 107 *bis.*) St. Louis.

Obs. Dr. Short and Mr. Griswold find the beautiful *Œ. Fraseri*, Pursh and Sims, Bot. Mag. 1674, allied to *Œ. fruticosa*, in Kentucky.

293. Gaura *biennis*, L.—St. Louis.

294. Gaura *angustifolia*, Mich.—Jacksonville. Covington.

295. Gaura *linifolia*, Nutt.—Jacksonville.—This is quite different from both the preceding species, and agrees with an original specimen of *G. linifolia* in my Herbarium, entirely in the foliage, but the flowers are much less densely spiked.

296. Jussieua *leptocarpa*, Nutt.—N. Orl. 1833.—The flowers are very small: the fruit very long, slender and cylindrical.

297. Jussieua *grandiflora*, Mich.—α. foliis acutis.—*J. grandifl. Sims, Bot. Mag. t.* 2122.—N. Orl. (*n.* 108.)—β. foliis brevioribus obtusis.—N. Orl. (*n.* 109.) 1833.—Our var. β. approaches

very near to the *J. repens,* Linn, and may possibly not be specifically distinct.

298. Jussieua *erecta,* L.—N. Orl. 1833. Covington.—An *Ludwigia decurrens,* Walt. Ell. ?
299. Isnardia *alternifolia,* D C.—Covington. St. Louis.
300. Isnardia *linearis,* D C. (*Ludwigia* Walt.—*Ludwigia angustifolia.*—Mich.) Covington.
301. Isnardia *virgata,* (*Ludwigia.*) Mich. —Covington.
302. Isnardia *hirsuta,* R. et S.—Covington.—This species is probably a hairy variety of *I. virgata.*
303. Isnardia *mollis,* Poir.—Covington.
304. Isnardia *palustris,* L.—N. Orl. (*n.* 110.) and 1833.
305. Isnardia *microcarpa,* Poir.—Covington.
306. Isnardia *cylindrica,* D C.—N. Orl. 1833.

HALORAGEÆ. *Br.*

307. Proserpinaca *palustris,* L.—N. Orl. (*n.* 111.) Covington.

EXCURSIONS IN THE NEIGHBOURHOOD OF QUITO, AND TOWARDS THE SUMMIT OF CHIMBORAZO, IN 1830.

By Col. Hall, of Quito.

(*Continued from p. 327, of the Botanical Journal.*)

VISIT TO ANTISANA.

On the 3rd of August, M. Boussingault and myself, accompanied by Don Jose Valdivieso, set off to visit the farm and mountain of Antisana. Antisana is one of the peaks of the Eastern Cordillera, situated S. 75° E. from Quito, at the distance, in a straight line, of thirty miles. The road across the upper or southern part of the Valley of Chillo. We crossed the ridge of El Chasque to the village of Conocoto, distant about two leagues, a little beyond which the rivers of San Pedro and Pite, having collected the streams from the head of the valley, unite to form the Guiallapamba. The road continues near the southern extremity of the hill of Yylalo, from the foot of which rise the hot-springs of San Pedro, or Alangusin. Though destitute of accommodations, they are frequented for their medicinal virtues; although from the analysis of M. Boussingault, it does not seem they possess any other than those of hot water. That of San Pedro, at the southern point of the hill, is surrounded by an Indian village, the inhabitants of which, by some happy casualty, have remained masters of the soil, and form, by their activity, industry, and comparatively easy circumstances, a pleasing contrast to the abject mass of the Indigenes. They have tiled houses, and live stock, and manufacture coarse linens, and other trifling articles with which they trade as far as Pasto and Barbacoas. The climate here is mild and agreeable; the elevation of San Pedro is 8,470 feet. The temperature of the spring is 101°. We continued our route across the valley, which is level, and cultivated. The ridge of Pasuchoa, with its rocky peaks, divides the head of it into two compartments, of which the western rises gradually towards the heights of Tiopullo, while the eastern ascends towards the roots of Sinchulagua, and Ruminavi. The latter was on a subsequent occasion the object of an excursion by Professor Jameson and myself, during a visit to the estate of Don Vicente Aguino. The most interesting object in it is the cascade of the Piti, which, descending from Sinchulagua, precipitates itself perpendicularly about 150 feet, into a wooded glen. All this tract is covered with thickets, rising sometimes to the dignity of forests. We found several shrubs and trees we had not before seen, especially the tree named by the inhabitants El Olivo, from its supposed resemblance to the olive. Vegetation here is favoured by the abundance of humidity. The clouds, collected on all the surrounding peaks, dissolve in abundant showers, or rather storms, accompanied by electric explosions, so numerous, that it seems to rain as much fire as water. A friend of mine once counted forty-three in five minutes. These storms often descend along the valley, and extend to Quito, because Pichincha forms part of

the area of the mountain basin, while a little further to the North, the village of Pomasqui is so dry as to have obtained the appellation of "Little Pieiro." Passing near the village of Pintac, we crossed a deep ravine, on the opposite brink of which stands the farm of Pinantura, which is the principal mansion of the estate of Antisana. Of the house it is sufficient to say it has all the characteristic defects already noted. Its elevation, by M. Boussingault's barometrical measurement, is 10,377 feet. Its medium temperature may be reckoned at about 52°. The next morning, accompanied by the owner of the estate, Don Jose Valdivieso, we set off for Antisana. Like Sicsipamba, Pinantura is situated at the foot of the Paramos; the Peak of Antisana is included within its boundaries, which descend to the woods of the Napo, so that it is a good day's journey across the property, the limits of which may, in fact, be considered indefinite, as, on the eastern slope of the Cordillera, they fall on a boundless uninhabited territory. The weather was favourable, by which must be understood still less the absence of rain than of wind, which, on these elevations is the most formidable obstacle to the traveller. On a former occasion, Professor Jameson and myself encountered such a blast, that our horses refused to proceed, and we had to dismount, not without some difficulty, to prevent being rolled down the turf into the ravines below. It is remarkable, that on the Cordillera, it is not at the greatest elevations the wind is most prevalent, but rather on the intermediate slopes. Continuing to ascend along the edge of a deep glen, we reached the farm-house, called Licso, the elevation of which is 11,440 feet; barley and potatoes are cultivated round it, a warm spring issues from the banks of the adjacent stream, the temperature of which is 81°. On the rocks, near the house, there is a stalactitic formation of carbonate of lime, but scarcely abundant enough to supply a kiln, though lime, and especially the carbonate, is scarce in the district of Quito. Ascending from Licso, we entered on the Paramos, and towards the evening arrived at the farm-house of Antisana, a desolate-looking building, in a region still more desolate. Its elevation is 13,430 feet. M. Humboldt speaks of this house as one of the highest inhabited spots on the globe; yet if Mr. Pentland's measurements in Upper Peru and Bolivia be correct, not merely solitary houses, but towns and villages are there found at equal or greater elevations: as Tucora, an Indian village, 14,252 feet; hamlet and post-house of Chullunguani, 13,869; post-house of Ancomarca, 15,772; principal square of the city of Potosi, 13,314 feet. The inhabitants of Antisana consist merely of an Indian herdsman, who resides in a hut of straw and mud, apart from the principal edifice, which is reserved for the occasional visits of the proprietor or bailiffs; at the time of the rodeo, or gathering of the cattle, which usually takes place once a month. On these occasions, the whole cavalry of the estate is mounted, and with the *posse comitatus* of the Indians, form a circle, embracing the extent of the pasture grounds, driving the cattle before them to a central point, where pens are prepared, (in case the court or *patio* of the farm is not employed for this purpose,) in which they are counted and branded with the peculiar mark of the proprietor. This service is not devoid of danger; the bulls, in particular, frequently become irritated, and charge through the line, bearing all before them; the dexterity, however, of the herdsmen in entangling them with a long rope of hide, called a *lazo*, aided by the intelligence of their horses, accustomed to this exercise, is generally more than a match for the animal's ferocity. The horses, when the *lazo* is thrown, plant themselves firmly, bending as direction may require, and thus affording their riders a *point d'appui* sufficient to check the bull's career, who seldom fails to be thrown to the ground. The bulls of Antisana are noted for their fierceness, which seems to depend on the greater or less extent of the pastures over which they range, being thus more or less accustomed to the sight and

dominion of man. In spite of the rodeos on all these estates, a considerable number of cattle escape to the deserts of the Paramos, or conceal themselves in the forests below. They are then called *alzados,* or *miscreants;* a term frequently in the Revolution applied by the Spaniards to the Patriots. The stock of Antisana is reckoned at about 4,000. It is curious that the two great reservoirs of cattle in South America are placed, one on the burning plains at the level of the sea, and the other near the limits of perpetual congelation. Mules and horses are equally bred in both; but the latter, though hardy, are inferior on the highlands, both in size and figure, to the breed of the lowlands. The best horses of Quito are those which are brought colts from the pastures of Guayaquil, and afterwards reared in the mountains.

We dined, on our arrival, in the open balcony of the mansion of Antisana, for the benefit of fresh air, with the thermometer at 36°, though, to say the truth, there was no room in the house big enough to hold a table, nor a door through which it could be introduced. We accommodated ourselves tolerably well at night with blankets and sheep-skins, and suffered little from cold, except M. Boussingault, who imposed on himself the task of getting up several times, to observe the horary variations of the barometer. The next morning we rode several leagues, through bog and mire, to examine what it was hoped might prove a silver mine, situated in a glen on the east side of the mountain. The specimens, however, produced nothing but iron pyrites. On the 6th we set out to visit the *Nevado,* or snowy summit of the mountain. We arrived early at the foot of the peak, which rises abruptly from the surrounding table land. The northern extremity swells into a dome, while the southern is terminated by sharp broken pinnacles. The intermediate space has somewhat the figure of a saddle seat, and as the slope seemed here least precipitous, we determined on attempting the ascent to the summit at this point. The surface of the snow was frozen hard, and the first part of the glacis was so steep and slippery, that it required the aid of M. Boussingault's mineralogical hammer to break a footing; but after mounting in this manner a few hundred feet, the slope became more gradual, and finally terminated in a plain, forming the connexion already mentioned betwixt the two extremities. This was the limit of my ascent; for having made an attempt at a point which seemed more accessible, I was subsequently obliged to return, and retrace the path of M. Boussingault. In the mean while he had continued to climb, and reached, by his computation, a part of the northern dome, not more than 200 feet below its summit: here a perpendicular ice-rock impeded his further progress: the barometer giving 17,653 feet. According to the measurement of the Academicians, Antisana is 19,305 feet high; but M. Boussingault could hardly be far mistaken as to the height of the rock betwixt him and the summit, which he compared to that of a middling-sized house; granting the intervening space to be 300 feet, or say, 18,000 feet, there is still a difference of 1,300 feet —an error I am the more inclined to consider on the part of the Academicians, because, judging by the sight, Cayambe, to which they give an elevation of 19,386 feet, is much higher than Antisana. The thermometer, at the point ascended, stood at 29°; but when the sun occasionally broke on the broad snow-field, it produced a glare too intense to be endured by the eyes, and a heat like that of an oven. The weather was partially clouded; but we were in part above the region of clouds, which rolled beneath our feet, and as the landscape glimmered far below, dim and blue through their misty veil, it reminded me of the shadowy worlds of Hades, described in Lord Byron's "Cain." Our descent, as may be supposed, was readily accomplished, and at 1 P. M. we were at the foot of the snow. I found the sun's reflected heat to be here 81°. The vegetation of Antisana has little to distinguish it from that of the other mountains. It is abundant in *Gentianæ,* one species of which, with a rich scarlet corolla, ornaments

the turf beside the rivulets. The same species is found also on Chimborazo; but I have seen it only on those two mountains. The *Sida Pichinchensis*, incorrectly named, because its habitat is by no means limited to Pichincha, grows in the sands near the summit, and close to the snow I found the same dwarf *Andromeda* we had met with on Pichincha; and in general, the Flora of these two mountains is, in every respect, similar. The following table will give an idea of the mean temperature of the house of Antisana, from observations made by Professor Jameson and myself in July, 1829:—

July 1st. .	6 A. M. .	33°	
	7 „ . .	35°	
	8½ „ . .	38°	
	2½ P. M.	45°	{ Water 44° / Hygr. 33° 3′
	4 „	.43°	
	5½ „	.37° 50′	
	Mean. .	38° 6′	

M. Boussingault, from the temperature of the ground, reckoned the mean at 40° 1′. An hygrometer, on Leslie's principle, gave 33° 3′=69° 7′ of Saussure. The dryness of the atmosphere at these elevations of Antisana is diminished by the clouds almost constantly gathering round the culminating points of the Andes.

We varied our direction, on our return, for the purpose of visiting a volcanic eruption, near Licso. It is one of the *freshest* in the country, having taken place in 1801. The head of it exhibits the appearance of a circular area, full of black scoriæ of calcined pumice-stone, without, however, any trace of a crater or profundity. From hence we observed, as it were, an immense torrent of the same materials poured down the ravine below, for a distance of about three miles, exactly to the point where the main road to Pinantura crosses the dell. M. Boussingault doubted, however, whether this should be considered as a torrent, or a simultaneous eruption from a longitudinal fissure. The want of a proper crater supports this opinion, and it may be added, that the scoriæ all down the ravine are heaped into a figure of a ridge, which seems more naturally the consequence of having been *thrown up* than *poured down* from the head of the valley. An eruption of Antisana in 1590 is mentioned by the Academicians; and M. Boussingault considered traces of fire to exist in a cave near the farm-house. The sharp broken pinnacles of the southern extremity of the Nevado are a further confirmation. This appearance is recognized in Pichincha, Carguirazo, and Capac Ucu, undoubted volcanoes. Truncated cones, such as Cotopaxi and Tunguragua, afford equal or stronger indications; while the dome of Chimborazo proves merely that its eruptions have been lateral. As we arrived rather late at the volcano of Licso, our intention was to sleep at the farm-house, and repeat our visit in the morning; but it was decreed we should carry into effect only the first half of our plan. We had been but an hour or two in bed when we were both awakened by a sharp darting pain in the eyes, and very soon found that the glare of the snow had almost wholly deprived us of sight. M. Boussingault's negro servant and an Indian, who had accompanied us, were found to be in nearly the same state, and the next morning we returned to Pinantura, M. Boussingault, with his mule led by an Indian, being unable to distinguish a step of the road, and the rest of us nearly in as bad a plight. Our lips and faces were also so chapped and peeled, that it took us nearly a week in Quito to recover our sight and human aspect.

(To be continued.)

CONTRIBUTIONS TOWARDS A FLORA OF SOUTH AMERICA AND THE ISLANDS OF THE PACIFIC.

By W. J. Hooker, LL.D. and G. A. W. Arnott, Esq. A.M. F.R.S.E.

I. Extra-Tropical South America.

(Continued from p. 322 of the Botanical Journal.)

COMPOSITÆ.

At page 276 of the above Journal, we intimated our intention to reserve our

account of the South American *Compositæ*, until the appearance of the Fifth Volume of De Candolle's Prodromus, which we were also the more desirous of doing, because many of our species were then with Mr. Don for his examination and opinion. The vast mass of materials, however, which have accumulated in the hands of Professor De Candolle, exceeding in number of species, he conjectures, all that were known by Linnæus of the whole vegetable kingdom, have greatly retarded the publication of his work; while, in the mean time, our collections have been returned by Mr. Don, in most cases, without any of his observations or remarks. Under this two-fold disadvantage we have thought it right, nevertheless, to undertake the task of describing our extensive collections, and thus to record the numerous and important discoveries that have been made by Messrs. Gillies, Cuming, Bridges, Mathews, Bertero (in a few instances), Tweedie, &c. The whole of the species here enumerated, one or two only excepted, are in our Herbaria.

The *tribes* and *sub-tribes*, and almost all the *genera*, are those of Lessing, in his *Synopsis Generum Compositarum*. We have, in several instances, added specific characters of species already described, but only in those cases where the increase of species seemed to require it.

TRIB. I.—CICHORACEÆ.—*Vaill. Juss. Less. Syn. p.* 126.

SUB-TRIB. I.—SCOLYMEÆ.—*Less. l. c.*

730. (1.) Myscolus *microcephalus*, Cass. Less. *Syn.* 126.—Scolymus Hispanicus, *Desf.*—Buenos Ayres. (Cult.) *Tweedie.*

SUB-TRIB. II.—HYOSERIDEÆ.—*Less. l. c. p.* 127.

MICROSERIS.—*Don.* (1832.) Lepidonema. *F. and M.* (1835.)

Rachis ebracteolata. *Achenium* obfusiforme, truncatum, sulcatum, glabrum, conforme. *Pappus* uniserialis, conformis, persistens, setaceus, setis autem basi valde dilatatis, superne scabris.—"Involucrum 8-*partitum, basi bracteolatum.* Herba *pusilla, radice annua.* Folia *plurima radicalia, profunde pinnatifida, subtus papillosa, sesquipollicaria; segmentis linearibus obtusiusculis, integerrimis, terminali longissimo.* Scapi *filiformes, monocephali, foliis breviores.* Involucrum *glabrum virens.* Corollæ *aureæ.—Genus* Krigiæ *affine, et præcipue differt acheniis longioribus et pappo uniseriali uniformi.*" *Don in Litt.*

731. (1.) M. *pygmæa.* Don, *in Ph. Mag.* (*April,* 1832.) *p.* 388.—Lepidonema Chilense. *Fisch. et Mey. Ind. Sem. Hort. Petrop. p.* 31.—Valparaiso, *Cuming* (*n.* 605). *Bridges* (*n.* 502.) From this Genus *Hymenomena,* Hook. *Fl. Bor. Am. v.* 1. *p.* 300, (not Cassini) only differs by the imbricated, not simple, involucre.

SUB-TRIB. III.—HYPOCHÆRIDEÆ. *Less. l. c. p.* 130.

SERIOLA[1].—*L. Less. l. c.*

†*Caulibus foliosis.*

732. (1.) S. *taraxacoides* (Hook. et Arn.) caule simplici monocephalo, foliis radicalibus runcinatis, involucri ad basin intertextim setoso-pilosi foliolis interioribus acuminatis.—Oreophila teraxacoides. *Don.* in *Ph. Mag.* (*April* 1832.)—Valparaiso. *Macrae, Bridges, Cuming,* (*n.* 486,) *Mathews,* (*n.* 369.)—The stem is one to two feet high, glabrous, and furnished with several leaves: these last are usually lanceolate, acuminated and entire, but the lower ones are slightly runcinate; the upper become gradually smaller and more remote. The flowers are about half an inch across.

733. (2.) S. *Brasiliensis,* (Less,) caule angulato ad inflorescentiam ramoso pleio- v. polycephalo, involucri glabri foliolis lineari-lanceolatis obtusiusculis.—*α. grandiflora;* capitulis 8—12 lin. longis. Porcellites Brasiliensis. *Less. in Linn. v.* 6. *p.* 103.—*Subvar. a.* glabra, foliis runcinatis. *Less. l. c.*—Mendoza, *Dr. Gillies:—subvar. b.* glabra, foliis integerrimis. *Less. l. c.*—Oreophila chondrilloides, *Don! MSS.* (*ex parte*).—Mendoza and Andes of Mendoza, *Dr. Gillies.* E. coast of Patagonia, *Dr.*

[1] We agree with Lessing, *Syn. p.* 130, in referring the South American species of *Porcellites* to this Genus. The European species have a simple involucre, with few or no scales at the base: the South American ones have it distinctly imbricated. *Porcellites,* Cass. the type of which is *Hypochæris radicata,* L. is identical with *Achyrophorus,* Gærtn. Our *Seriolæ* here given, we are informed by Mr. Don, belong to his genus *Oriophila,* the original species of which he describes as having a sessile *pappus:* a character at variance with all the South American ones we have seen (even those from Peru).

Eight[1].—*Subvar. c. hirsutula, Less. l. c.* —Buenos Ayres, *Tweedie.*—β. *parviflora;* capitulis 4—6 lineas longis.—Buenos Ayres and Banda Orientale, *Tweedie.*—We have been unable to find any other difference between α and β, except what we have pointed out, although the general appearance be very distinct. In β, the stem is either quite glabrous or slightly hispid, and the leaves are either quite entire, or the lower ones are pinnatifid.

734. (3.) S. *Tweedii* (Hook. et Arn.); caule angulato ad inflorescentiam ramoso, foliis caulinis amplexicaulibus basi auriculatis integris vel pinnatifidis, involucro breviter setoso-villoso.—Buenos Ayres, where it is frequently employed as Endive. *Tweedie.*

†† *Caulibus ad ramificationum baseos folio unico instructis, cæterum aphyllis.*

735. (4.) S. *apargioides* (Less.); foliorum radicalium petiolis limbo multo brevioribus, caule plus minusve ramoso, involucri hirsutiusculi foliolis ligulatis vel lineari-lanceolatis obtusis.—α. caule glabro. Porcellites apargioides. *Less. in Linn. v.* 6. *p.* 102.—Oreophila apargioides. *Don. Phil. Mag.* (*Apr.* 1832), *p.* 388.—*Subvar.* α. foliis glabriusculis.—Valparaiso, *Mr. Cruckshanks; Cuming (n.* 485.*); Bridges (n.* 503.*)*—*Subvar. b.* foliis hirsutis.—Valparaiso. *Mr. Cruckshanks; Cuming* (*n.* 413.) —β. caule hispido.—Oreophila picroides. *Don. l. c.*—Hypochæris apargioides. *Hook. et Arn. in Bot. Beech. Voy.* 1. *p.* 28. —Conception, *Messrs. Lay and Colley.* —We find the leaflets of the involucre to be constantly obtuse, not acute as described by Lessing: and the pappus is really stipitate, though erroneously described by us in Beechey's Voyage as sessile. We were deceived by the fruit being immature.

736. (5.) S. *petiolaris* (Hook. et Arn.); foliis radicalibus sinuato-dentatis glabris, petiolis gracilibus limbo longioribus, caule submonocephalo glabro v. piloso foliis 2—4-plo longiori, involucri glabri foliolis lineari-lanceolatis intimis acuminatis.—Buenos Ayres, *Tweedie.*

737. (6.) S. *tenuifolia* (Hook. et Arn.); "acaulis, foliis linearibus spathulato-oblongisve integerrimis runcinatisque scapo monocephalo brevioribus, involucri squamis ovato-lanceolatis acuminatis, bracteolis longe cuspidatis."—Oreophila tenuifolia. *Don, MSS.*—Quebrada de Rios, Andes of Mendoza, *Dr. Gillies.*—"*Herba* parce lanuginosa, demum glabrata. *Scapus* sesqui-tripollicaris. *Capitulum* turbinatum lanuginosum. *Pappus* sordide cinereus." *Don in litt.*

[1] Some very interesting plants from the extreme southern countries of South America and parts of the Pacific, gathered by this gentleman while on a voyage of discovery in an American vessel, have been very generously communicated to us by Dr. Beck, from the Curators of the Albany Institute, New York.

SUB-TRIB. IV. LACTUCEÆ.—*Less. l. c. p.* 135.

738. (1.) Taraxacum *Gilliesii* (Hook. et Arn.); "foliis runcinatis glabris, scapis folio brevioribus, involucri foliolis exterioribus ovato-lanceolatis acutis adpressis, achenio breviter rostrato."—Leontodon Chilensis, *Don, MSS.*—Las Guindas, Andes of Mendoza, *Dr. Gillies.*—"*Herba* perennis, radice fusiformi. *Scapi* purpurei, fistulosi, glabri. *Rachis* epaleata, *Achenia* compressa, minute tuberculata, apice attenuata. *Pappus* uniformis, mollissimus, albus, capillaris." *Don, in litt.*—We do not possess the mature achenium; nor have we seen any specimens among Dr. Gillies' sufficiently advanced to enable us to pronounce on the ultimate length of the beak. Except in the shorter scape and smaller capitulum, it appears scarcely to differ from T. *palustre,* of which we fear it will prove to be a variety. Mr. Don's specific name is inadmissible, as the plant is found on the eastern, not on the Chilian, side of the Andes.

739. (1.) Macrorhynchus *Chilensis.*—Less. *Syn. p.* 139.—Valparaiso, *Cuming* (*n.* 745); *Mathews* (*n.* 306); *Bridges* (*n.* 501 and *n.* 500).

740. (1.) Sonchus *oleraceus,* L.—Bahia Blanca,[2] *Tweedie.*—Near Limarche in Quebrados, Chili, *Bridges* (*n.* 407).

[2] Mr. Tweedie's last botanical excursion on the eastern shore of South America, was to "*Bahia blanca,*" between lat. 39°—40°, a little to the north of the mouth of the Rio Colorado. He speaks of it as a part of Patagonia; but it is not included in that country according to our best English maps. It is now a considerable military station, called Fuerte Argentino. Although so much to the southward of Buenos Ayres, its vegetation is not very dissimilar. "Round the coast of the Bay, from two to six miles inland," Mr. Tweedie remarks, "is one continued salt marsh, partly covered with salt and partly with low bushes; beyond which is a soft, dry soil, where little is found but coarse grasses. A ridge of land, bounding this, called Los Loamos, is occupied with ever-green shrubs; but nothing in the shape of a tree is visible so far as the

741 (2.) S. *pectinatus*, D C.—Patagonia, East coast, *Dr. Eight;* probably introduced.

SUB-TRIB. V.—HIERACIEÆ, *Less. l. c. p.* 140.

DENDROSERIS, *Don, in Ph. Mag. (Apr.* 1832.) *p.* 388.—Rea. *Bert. in Guill. Arch. (June,* 1833).

This Genus, having a rigid fragile pappus, belongs to the *Hieracieæ* of Less.; but forms a distinct section from any in his synopsis, and which may be thus characterized:—

§ *Acheniis basi et apice emarginatis, trigonis v. compressis.*

742. (1.) D. *macrophylla*, Don, *l. c.*—Rea macrantha. *Bert.—Decaisne, in Guill. Arch. v.* 1. *p.* 514.—At Juan Fernandez, *Bertero.* Massafuera, *Cuming* (*n.* 1350).

743. (2.) D. *Berteriana*, Hook. et Arn. —Rea Berteriana. *Decaisne, l. c. p.* 515.—Juan Fernandez, *Bertero.*

744. (3.) D. *pinnata*, Hook. et Arn.—Rea pinnata, *Bert.—Decaisne, l. c. p.* 516.—Juan Fernandez, *Bertero ; Douglas.*

745. (4.) D. *neriifolia*, Hook. et Arn.—Rea neriifolia, *Decaisne, l. c. p.* 517.—R. leucantha, *Bert. in Hook. Herb.*—Juan Fernandez, *Bertero.*

746. (5.) D. *micrantha*, Hook. et Arn.—Rea micrantha. *Bert.—Decaisne, l. c. p.* 518.—Juan Fernandez, *Bertero.*

747. (6.) D. *marginata*, Hook. et Arn.—Rea marginata, *Bert.—Decaisne, l. c. p.* 519.—Juan Fernandez, *Bertero.*

748. (7.) D. *mollis*, Hook. et Arn.—Rea mollis, *Bert.—Decaisne, l. c. p.* 519.—Juan Fernandez, *Bertero.*

749. (1.) Hieracium *Chilense*, Less. *in Linnæa, v.* 6. *p.* 100.—β. inflorescentia pilis brevibus rigidiusculis nigris obsessa. —β. plains near " los Andes," province of Valdivia, *Bridges* (*n.* 780).

750. (2.) H. *cymosum*, Vill.?—H. sordidum, *Gill. MSS.*—Mendoza, *Dr. Gillies.* Maldonado (introduced ?), *Tweedie.*

751. (1.) Picrosia *longifolia*, Don, *in Linn. Soc. Trans. v.* 16. *p.* 184. *Less. Syn. p.* 143.—P. runcinata. *Gill. MSS.* —Tragopogon fritillarioides. *Less. in Linnæa, v.* 6. *p.* 101.—Frequent in all wet places near Buenos Ayres, *Tweedie.* Mendoza. *Dr. Gillies.*—Lessing inserts this among the *Hieracieæ*, one of the characters of which groupe is " pappus fragillimus ;" while Don says of this Genus " pappus mollis." To us the pappus appears to be certainly neither rigid nor fragile, although it is more so than in the *Lactuceæ*, from which, moreover, it differs in the brown, not white, colour. In Dr. Gillies' specimens, the radical and lower stem-leaves are runcinate.

TRIB. II. NASSAUVIACEÆ.[1]—*Less. l. c. p.* 396.

SUB-TRIB. I. TRIXIDEÆ.[2]—*Less. l. c. p.* 400.

752. (1.) Moscharia *pinnatifida, R. and P. Syst. Veg. Fl. Per. v.* 1. *p.* 186. *Less.*

sight can reach : though many of the shrubs are of the same species as are *arborescent* at Buenos Ayres." About thirty miles from the coast, and in a direction north-west from the fort, a considerable hill, called *Cerra de la Ventosa*, part of a branch of the Cordilleras, which extends itself in this direction towards the South Atlantic Ocean, would unquestionably have afforded many valuable plants, could Mr. Tweedie have had access to it : but though he obtained passports from the commandant of the fort, they could not have secured him against the attacks of the Indians, who are both numerous and hostile throughout the whole district ; and are only kept in awe in the immediate neighbourhood of the Bay, by means of a very strong garrison.

[1] This tribe is easily distinguished from the other *Labiatifloræ*, by the branches of the style being truncated and penicellate at the apex, like those of *Senecio.*

[2] Although we have admitted Lessing's two *subtribes* of the *Nassauviaceæ*, we cannot but think them much invalidated by a new Peruvian Genus we possess, which has all the characters of *Nassauvieæ*, with the habit of *Jungia*, which belongs to the *Trixideæ ;* and as M. Lessing's *Pentanthus* has now merged into *Panargyrum*, we shall here adopt that name for it. *Pentanthus*, Hook. et Arn. (*non Less.*). *Involucrum* cylindricum, uniseriale ; *foliola* 5 flosculis opposita, lineari-oblonga, obtusiuscula, striata, basi callosa, rigida, duo margine utrinque, unico, hinc solummodo margine scarioso, reliquis margine scarioso destitutis. *Capitulum* 5-florum, flosculis uniserialibus. *Rachis* glabra, ebracteolata. *Corollæ* bilabiatæ ; labio superiore profunde 3-fido, interiore profunde bifido. *Antheræ* basi ecaudatæ. *Achenium* erostre, glabrum, callo basilari. *Pappus* pluriserialis, setosus, scaber. —Suffruticosa, *ramosa.* Caules *ramique glaberrimi, subglauci.* Folia *longe petiolata, alterna, exstipulata, cordato-subrotunda*, 5—7-*angulato-lobata, hinc inde apiculato-dentata, supra glabra, reticulato-venosa, subtus leviter pubescentia.* Rami *floriferi axillares, folio multum longiores, apice corymbosi, folio unico ad basin corymbi.* Pedicelli *fastigiati, capitulum subæquantes, folia minuta, imperfecta, linearia gerentes.* Pappus *sordide fulvus.* Corollæ *albæ.* Styli *rami apice truncati, ibique*

in Linnæa, v. 5. *p.* 39. *Syn. p.* 417.—*Mosigia pinnatifida, Spr. Syst. Veg. v.* 3. *p.* 661. *Gastrocarpha runcinata, Don. in Linn. Trans. v.* 16. *p.* 232.—Valparaiso, *Mathews* (*n.* 261.); *Cuming* (*n.* 499 *and* 775.); *Bridges* (*n.* 488.

The under side of the young leaves is frequently covered with woolly tomentum, which eventually disappears. Cuming's *n.* 775, is a very luxuriant form, several feet high: its leaves at the base of the branches of the inflorescence are very large, broadly triangular, some about three inches long and two broad at the base.

753. (1.) Jungia *floribunda*, Less. *in Linnæa, v.* 5. *p.* 38.—*J. pyramidalis, Don, in Linn. Trans. v.* 16. *t.* 299.—Portalegre, and Rio Grande, *Tweedie.*

754. (1.) Trixis (Cleanthes) *othonnoides*, Less. *in Linnæa, v.* 5. *p.* 27. *Cleanthes othonnoides, Don, in litt.*—*Cacalia scabra, Vahl, Symb. v.* 3. *p.* 92. —*Leuceria echioides, Gill. Don, in Phil. Mag. Apr.* 1832. *p.* 389, (*teste Don, in litt.*).—Pampas of Buenos Ayres. *Dr. Gillies.*—With this we are unacquainted.

755. (2.) Trixis (Cleanthes) *ochroleuca*, Hook. et Arn.—*Holocheilus ochroleucus, Cass.*—*Platycheilus ochroleucus, Cass.*—*Perezia ochroleuca, Less. in Linnæa, v.* 5. *p.* 22. *Syn. p.* 413.—*Leuceria conyzoides, Don, in Phil. Mag. Apr.* 1832. *p.* 389.—*Cleanthes conyz. Don, in litt.*—Buenos Ayres, San Luis and Andes of Mendoza, *Dr. Gillies. Tweedie.* Uraguay, *Tweedie.*—We cannot distinguish this, by Lessing's description, from the glabrous forms of his *T. othonnoides.* Don, on the other hand, informs us that his *Leuceria echioides* is Lessing's plant. Lessing, again, considers this species to be the same as *Cleanthes Brasiliensis,* and that *Cl. hieracioides,* Don, is not really different. *Trixis* (*Cleanthes*) *Brasiliensis,* Don (not De Cand.) seems to have the flowers considerably larger, and of a yellow colour, and in this respect is more allied to *T. pinnatifida,* Less.; but with that exception, we feel much disposed to view all the others as forms of one and the same plant, which is readily recognized by its milk-white florets and pappus, and by the inner lip of the corolla being oblong and usually undivided, except at the apex. If we are correct, the specific name of *ochroleuca* ought to be retained, the older one of *scabra,* not being applicable to all the variations. Be that as it may, the plant before us is nearly glabrous, and has constantly the leaflets of the involucre broadest and rounded at the apex, where also they are villous and ciliated.

756. (3.) Trixis (Oligophyllon) *Brasiliensis,* De Cand. *(excl. syn.)*—*Less. in Linn. v.* 5. *p.* 26. *Syn. p.* 413.—Marsh near Portalegre, *Tweedie.*—As this is now ascertained to be different from the Linnæan plant, it is to be regretted that the name has not been changed. We would suggest that of *Candollii.*

757. (4.) Trixis (Polyphyllon) *Megapotamica* (Hook. et Arn.); caule herbaceo usque ad inflorescentiam folioso hirsuto-pubescenti, foliis (superioribus) oblongo-lanceolatis mucronatis integerrimis vel minute denticulatis basi attenuatis decurrentibus vel subdecurrentibus utrinque hirsute pubescentibus, capitulis 8—12-floris, involucri foliolis 9—13 biserialibus conformibus lineari-oblongis subacuminatis extus sericeis, pappo rufescente.—Mountains of Rio Grande, *Tweedie.*—The inflorescence is a compound raceme, the pedicels are shorter than the involucre, and furnished about the middle with a solitary bractea, similar to, but rather larger than, the leaflets of the involucre.

758 (5.) Trixis (Eutrixis) *discolor,* Gill. *MSS. Don, in Phil. Mag. Apr.* 1832, *p.* 388.—La Porta de las Achiras, Prov. of San Luis. *Dr. Gillies.*

759. (6.) Trixis (Eutrixis) *papillosa,* Gill. *Don, l. c.*—Provinces of San Luis and Mendoza. *Dr. Gillies.*—The leaves (and we have only seen the upper ones) are so much attenuated at the base as almost to form a kind of winged petiole. The flowers are disposed in a few-headed terminal corymb: leaflets of the involucre in a single series, narrow-lanceolate and acuminated; there are also a few bracteas between the middle of the pedicel and base of the involucre. The flowers appear to be white.

760. (1.) Perezia (Homœanthus) *spathulata,* Hook. et Arn. — *P. viscosa, Less. Syn. p.* 408 (1832).—*Clarionia spathulata, Lag.*—*Don, in Linn. Trans. v.* 16. *p.* 205. (1830).—Near Los Andes, Prov. of Valdivia, *Bridges,* (*n.* 778).

761. (2.) Perezia (Homœanthus) *acanthoides* (Hook. et Arn.); "glanduloso-

pedicellati.—P. *jungioides.* H. and A.—HAB. Purruchura, Peru; *Mathews* (*n.* 1016.).—Very closely allied to *Jungia spectabilis,* Don: and indeed the Genus may be considered as *Jungia,* with the florets reduced to a single series, and in which case the bracteas of the florets become the leaves of the involucre. As in *J. spectabilis,* the pappus is not plumose.

pubescens, foliis caulinis amplexicaulibus cordato-lanceolatis mucronatis dentato-spinosis, capitulis corymbosis, rachide pubescente, acheniis hirsutis.—*Clarionia acanthoides. Don, MSS.*—Mendoza, *Dr. Gillies.*—" *Caulis* sesquipedalis, teres, albicans, ramosus. *Involucri foliola* duplice ordine, subæqualia, ovato-lanceolata, spinuloso-mucronata, margine scariosa. *Corollæ* cæruleæ. *Pappus* sordide fulvus." *Don, in litt.*—This we have not seen.

762. (3.) Perezia (Drozia) *virens*, Hook. et Arn.—*P. Pœppigii, Less. Syn. p.* 411. (1832.)—*Clarionia virens, Don, in Linn. Soc. Trans.* 16. *p.* 208, 1830—fide Don. —Cordilleras of Chili, *Cuming* (*n.* 238.) —Los Ojos de Agua, *Bridges* (*n.* 493.) As Mr. Don has ascertained our plant, which is doubtless identical with Lessing's, to be his *C. virens*, we presume the Peruvian locality given by him from Ruiz and Pavon's MSS. to be incorrect. The rachis is villous, and the achenia hirsutely villous.

763. (4.) Perezia (Stenophyllum) *Beckii* (Hook. et Arn.); foliis coriaceis linearibus conformibus integerrimis spinoso-ciliatis supra lævibus (haud transversim rugulosis) utrinque pilis minutissimis cartilagineis adspersis, achenio compresso (immaturo) sparsim ac minutim glanduloso-pubescenti.—East coast of Patagonia, *Dr. Eights.*—This differs from P. *Doniana*, Less., and P. *recurvata*, Less., both belonging to the same section, and very closely allied, by the leaves not being transversely rugulose. The ciliæ are usually in a single, but sometimes in a double series; they are white and disposed on the upper surface near the margin, not *on* the margin, as at first sight they appear, from its being much recurved. The achenium is probably glabrous, when mature, as in *P. Doniana.*

764. (5.) Perezia (Euperezia) *Magellanica*, Less. *in Linnæa, v.* 5. *p.* 23. *Syn. p.* 413.—*Perdicium Magellanicum, Linn. Vahl in Skrivt, Nat. Selsk.* 1. *p.* 10. *t.* 4.—*Clarionia Magellanica, De Cand.*—Cape Horn. *Dr. Eights.*

765. (6.) Perezia (Euperezia) *carthamoides* (Hook. et Arn.); caule oligophyllo, foliis membranaceis radicalibus caulem æquantibus vel superantibus longe petiolatis sinuato-pinnatifidis laciniis undulatis sinuato-incisis spinoso-ciliatis, caulinis late linearibus sessilibus irregulariter spinoso-dentatis, involucri foliolis exterioribus foliaceis, foliis caulinis supremis similibus, interioribus latissime albide scarioso-marginatis spinoso-mucronatis, ovariis papulosis, rachide glabro.—*Clarionia carthamoides, Gill. Don in Phil. Mag.* (*Apr.* 1832.) *p.* 328. *in Guill. Arch.* 2. *p.* 464.—El Cerro de la Polcura, Andes of Mendoza, *Dr. Gillies.* Cordilleras of Chili, *Cuming* (*n.* 196.). Near La Laguna, Cordilleras, *Bridges* (*n.* 494.)

766. (7.) Perezia (Euperezia) *ciliaris;* " foliis lanceolatis acuminatis membranaceis margine copiose setaceo-spinulosis, caulinis amplexicaulibus, capitulo solitario, involucri foliolis exterioribus spinuloso-ciliatis. — *Clarionia ciliaris, Don, MSS.*—*Caulis* erectus, filiformis, simplicissimus, sesquipedalis. *Folia* radicalia, longe petiolata, 3—4-pollicaria, gramineo-viridia. *Involucri foliola* lineari-lanceolata, acuminata, membranacea." *Don in litt.*—With this we are unacquainted; we believe it to be one of Cuming's plants, and therefore suspect it is a mere state of *P. carthamoides.*

767. (8.) Perezia (Euperezia) *pilifera*, Hook. et Arn.—*Clarionia pilifera, Gill. Don in Phil. Mag.* (*Apr.* 1832.) *p.* 388. *Guillem. Arch.* 2. *p.* 463.—Cerro de la Polcura, Andes of Mendoza, *Dr. Gillies.* —The petioles of the radical leaves are broad, and at least as long as the limb: the segments are closely approximated, and tipped with a white rigid hair or bristle. It is a small species, scarcely more than an inch and a half or two inches high.

768. (1.) Dolichlasium *glanduliferum*, Lag.—*D. Lagascæ, Gill.*—*Don in Phil. Mag.* (*Apr.* 1832.) *p.* 389. *in Guillem. Arch.* 2. *p.* 465.—Mines of Uspillata and of Mendoza, *Dr. Gillies.*—" Herba perennis, virens, copiosissime glandulosa. *Caules* erecti, teretes, subflexuosi, monocephali, 3—4 pollicares. *Folia* petiolata, pinnatisecta; segmentis ovato-oblongis, mucronatis, subintegerrimis, rigidis, terminali plerumque trilobo majori. *Capitulum* solitarium, magnum. *Corollæ* albæ. *Achenia* rostrata. *Pappus* longus, albus." *Don in litt.;* to which we may add, *Capitulum* discoideum (nec, ut in aliis *Nassauviaceis*, radiatiforme) multiflorum, involucri foliola omnia integerrima, acuminata, exteriora lanceolata, interiora lineari-lanceolata, elongata. Flosculi omnes tubuloso-bilabiati! labiis tubo fere triplo brevioribus! nec ut in affini *Perezia* aliisque hujus tribus generibus labio exteriori tubum subæquanti vel superanti. *Styli* rami exserti, apice truncati, penicillati. *Achenium* adpresse hirsutum, rostro tenuioiri achenio brevi-

ori glabro glandulis pedicellatis patentibus obsito; disco epigyno magno. *Pappus* breviter tantum plumosus, denticulis tamen longioribus quam in *Perezia*.—The habit of this plant is that of a *Perezia*, and if united to that Genus, it should be placed between Lessing's first and second Sections. From that, however, independently of the pappus, which is not much at variance, we are inclined to distinguish the present one by its tubular florets, which induced Cassini to refer it to the *Mutisiaceæ*, although differing from them by the style, which is entirely that of the *Nassauviaceæ*.

769. (1.) Leuchæria (Euleuchæria) *senecionides*, Hook. et Arn. *in Bot. of Beech. Voy. p.* 28. *L. tenuis, Less. Syn. p.* 402.—*L. rosea, Less. l. c.*—*Trixis senecionides, Hook. Exot. Fl. t.* 101. (ad plantam cultam.)—Valparaiso, *Cruckshanks: Macrae; Mathews (n.* 255.); *Bridges (n.* 495); *Cuming (n.* 505.)—Conception, *Messrs. Lay and Collie*.—The flowers are either white or purplish; in both varieties the pappus of the outer row of florets is always shorter than in the inner ones, but the exact proportion they bear to each other is far from constant. The leaflets of the involucre are in a double series. The bracteoles of the rachis (which we overlooked in the "Botany of Beechey's Voyage") in this, as well as in all the other species we have seen, are either acute or serrulate at the apex, never with a long acumination. The tomentum on the stem and peduncles is so copious as almost to conceal the short glandular hairs found in all the branched species of the genus. This is recognized by its slender root and stem, and the very lax inflorescence, all or most of the capitula being on long pedicels; it varies from three or four inches to a foot and half, or nearly two feet high.

770. (2.) Leuchæria (Euleuchæria) *acanthoides*, Don *in Linn. Soc. Trans.* 16. *p.* 213.—Andes of Chili, *Cuming (n.* 180 and *n.* 295). Near Collina, *Bridges (n.* 487.)—This seems to be a biennial plant, differing apparently from *L. hieracioides*, Cass. (judging from Lessing's description), by the segments of the cauline leaves being lanceolate, acuminate, and mucronate, with revolute margins; they are also frequently again sinuato-pinnatifid.

771. (3.) Leuchæria (Euleuchæria) *divaricata* (Don); caule elato valido superne in paniculam maximam patentem diviso, pube conspicuo difformi, foliis inferioribus subbipinnatifidis, laciniis ellipticis acuminatis, capitulis subsessilibus versus apices pedunculorum subternis, involucri foliolis arcte imbricatis rigidiusculis, rachidis bracteolis elliptico-ovatis apice acutis vel eroso-denticulatis. —*Don in Linn. Soc. Trans.* 16. *p.* 214. —Valparaiso, *Cuming (n.* 584.)—This coincides in many points with *L. paniculata, Less. Syn. p.* 403, but the bracteoles of the rachis are there described as being furnished with a long acumination, which we have not met with in any species.

772. (4.) Leuchæria (Euleuchæria) *congesta*, Gill.—*Don in Phil. Mag. (Apr.* 1832.) *p.* 389; in Guill. Arch. 2. p. 464. —Cuesta del Inga, Andes of Chili, *Dr. Gillies*.—Readily recognized by the decurrent leaves and compact inflorescence; but perhaps this last character is not constant.

773. (5.) Leuchæria (Cassiopea, Don,) *runcinata* (Gill.); caule elato obsolete lanuginoso pilis glanduliferis brevibus rufidulis copiosissime ornato, foliis pinnatifidis subtus lanatis demum glabratis rigidiusculis radicalium segmentis late cuneiformi-ovalibus sinuato-dentatis caulinorum angustioribus acuminatis mucronato-subpungentibus, involucri campanulati foliolis interioribus scariosis lineari-lanceolatis acuminatis, ligula ovali tubo multo latiori. *Don in Phil. Mag. (Apr.* 1832.) *p.* 389; *in Guill. Arch.* 2. *p.* 464.—*Lasiorrhiza rosea, Less. Syn. p.* 405. ?—Andes of Mendoza, *Dr. Gillies*. Cordillera of Chili, *Cuming (n.* 186.); *Bridges (n.* 484.)—The upper side of the radical leaves is almost glabrous, of the lower cauline ones slightly woolly, and of the upper or bracteal ones copiously covered with glandular hairs. These glands, however, as well as the woolly tomentum on both sides, almost entirely disappear when the plant becomes old. Mr. Don places it among the true species of *Leuchæria*; but there are no bracteoles within the outer row of florets.

774. (6.) Leuchæria (Cassiopea) *Gilliesii* (Hook et Arn.); caule lanato tomentoso superne pilis brevibus nigro-glandulosis onusto, foliis superioribus amplexicaulibus subauriculatis lanceolatis inciso-dentatis vel integris subtus lanatis supra eglandulosis demum subglabratis rigidis margine revolutis, dentibus acuminatis mucronato-pungentibus, involucri campanulati foliolis interioribus lineari-oblongis acuminatis exterior-

ibus copiose glandulosis, ligula ovali-oblonga.—*L. hieracioides, Gill.*—*Don in Phil. Mag.* (*April* 1832) *p.* 389: *in Guill. Arch.* 2. *p.* 464. (not of Cass.)—Cerro de la Polcura, Andes of Mendoza, *Dr. Gillies.*—This differs from *L. Bridgesii* by the more copious glandular hairs, denser tomentum on the under side of the leaves, and by having the leaves scarcely auricled at the base.

775. (7.) Leuchæria (Cassiopea) *Bridgesii* (Hook et Arn.); caule arachnoideo-tomentoso versus apicem obscure-glanduloso-piloso, foliis superioribus subrigidis pinnatifidis subtus parce lanatis supra demum glabratis eglandulosis basi late auriculatis, segmentis lanceolatis subintegerrimis acutis vel acuminatis pungenti-mucronatis margine subrevoluto, involucri campanulati foliolis scariosis acuminatis subpungenti-mucronatis, ligula elliptica oblonga (alba).—Cordillera. *Bridges* (*n.* 486).—This seems to differ in several particulars from *Lasiorrhiza rosea, Less.* In our plant, the stem is only about nine inches high, the glandular hairs very few, and only towards the summit, and the upper surface of the leaves is entirely free from them.

776. (8.) Leuchæria (Cassiopea) *Cumingii* (Hook et Arn.); caule lanato superne pilis glanduliferis parce ornato, foliis pinnatifidis subtus lanatis supra demum glabratis, segmentis oblongis acutis sinuatim 1—2-dentatis, bractealibus lanceolatis dentatis, involucri campanulati foliolis interioribus scariosis lineari-oblongis acutis, ligula anguste lineari-lanceolata! basi tubo vix duplo latiori.—Coquimbo, *Cuming* (*n.* 906).—This can scarcely be either *L. pulchella* or *L. glandulosa* of *Don*, although both are likewise found at Coquimbo, for he could not have omitted to observe the remarkable narrow ligule of the floret, by which the present is at once distinguishable from all the other species of the section with which we are acquainted.

777. (9.) Leuchæria (Lasiorrhiza, *Don,*) *candidissima, Gill.*—*Don in Phil. Mag.* (*Apr.* 1832.) *p.* 389. *in Guill. Arch.* 2. *p.* 464.—El valle de los Ciegos, Andes of Mendoza. *Dr. Gillies.*—Very nearly allied to *Lasiorrhiza* (or *Chabræa*) *purpurea.*

778. (10.) Leuchæria (Lasiorrhiza) *scrobiculata.* Gill.—*Don in Phil. Mag.* (*Apr.* 1832.) *p.* 389; *in Guill. Arch.* 2. *p.* 464.—La Cuesta del Inga, Andes of Chili, *Dr. Gillies.*—These two last belong, unquestionably, to *Lasiorrhiza* of Lagasca, or *Chabræa* of Decandolle, and have one-flowered stems, their habit thus differing widely from that of Mr. Don's section *Cassiopea,* or *Lasiorrhiza* of Lessing, all the species of which have a very branched inflorescence; but on the other hand, there is no difference in the structure of the flowers. *Martrasia* of Sprengel (Gen. p. 626.) includes the true species of *Leuchæria,* but the genus of Lagasca and Cassini, of the same name, is *Jungia ferruginea,* Linn.

779. (11.) Leuchæria (Lasiorrhiza) *laciniata* (Hook. et Arn.); acaulis, foliis radicalibus dense canescenti-pubescentibus pinnatifidis, segmentis oblongo-linearibus paucidentatis terminali longiore, scapo monocephalo dense villoso, involucro villoso campanulato foliolis interioribus linearibus acuminatis, pappo piloso (haud flexuoso).—Chili, *Bridges:*—in Dr. Hooker's herbarium only as far as we know.

Subtrib. II.—Nassauvieæ.—*Less. Syn. p.* 396.

780. (1.) Polyachrus *Poeppigii,* Kunze.—*Less. in Linnæa,* 5. *p.* 5. *Syn. p.* 400. *exl. Syn.*—*P. auritus, Don, in Phil. Mag.* (*Apr.* 1832.) *p.* 390; *in Guill. Arch.* 2. *p.* 466.—Valparaiso, on cliffs along the coast. *Bridges* (*n.* 489.); *Cuming* (*n.* 448.); *Macrae; Matthews* (*n.* 316.)—*P. sphærocephalus* of Don is distinct: it is a Peruvian plant, and the same with *Bridgesia echinopsoides, Hook.;* it is in Matthews' Collection from San Mateo, *n.* 641.

781. (2) Polyachrus *multifidus,* Don, *in Phil. Mag.* (*Apr.* 1832). *p.* 390; *in Guill. Arch.* 2. *p.* 466.—Coquimbo, *Cuming* (*n.* 876.)

782. (1.) Caloptilium *Lagascæ,* Hook. et Arn.—*Sphærocephalus Lagascæ, Gill. MSS.*—*Don in Phil. Mag.* (*Apr* 1832.) *p.* 389. in *Guill. Arch.* 2. *p.* 465.—Ascent of Los Peuquenes, Andes of Chili. *Dr. Gillies.*—Mr. Don (*l. c.*) describes the leaves as costate; following Lessing's phraseology, they would be characterized thus,—folia nervis plurimis impressis parallelis. The pappus is in a simple series, paleaceous, plumose and caducous. We do not know the original species of this genus; but, from the short description given by Lagasca, it appears to be very similar to, if not the same with, that from Dr. Gillies.

783. (1.) Panargyrum *glomeratum,* Gill.—*Don in Phil. Mag.* (*Apr.* 1832.) *p.* 390: *in Guill. Arch.* 2. *p.* 466.—El Cerro de la Polcura, Andes of Mendoza,

and Valle de los Ciegos. Andes of Chili, *Dr. Gillies.*—We believe that it is on Lagasca's authority that Mr. Don considers this and the next to belong to *Panargyrum;* but neither of them can be the original species described, for Lagasca states the leaves to be entire. The pappus is paleaceo-setaceous, its rays sprinkled with short hairs or longish teeth, so that they may either be termed slightly plumose with Lagasca, or dentato-ciliated with Don. We prefer the latter from their affinity with *P. spinosum,* where the rays are only serrulate.

783. (2.) Panargyrum *uniflorum,* Gill. —*Don in Phil. Mag.* (*Apr.* 1832.) *p.* 390, *in Guill. Arch.* 2. *p.* 466.—Paramillo de las Cuevas, Andes of Medoza, *Dr. Gillies.*—In both this and the last, (as well as in the following species), the leaves are spinously incise-toothed, not pinnatifid, as Mr. Don says. *P. glomeratum* has a glaucous hue, and the teeth of the leaves about half the breadth of the limb. *P. uniflorum,* (more properly *P. monocephalum*), is of a dark shining green, with the teeth of the leaves as long as the whole breadth of the limb. The capitula are not really solitary; but usually, two, three, or four are approximated at the extremity of the branches.

784. (3.) Panargyrum (Piptostemma, Don,) *spinosum,* Gill.—*Don, in Phil. Mag.* (*Apr.* 1832.) *p.* 390: *in Guill. Arch.* 2. *p.* 466.—Peron in Chili, *Dr. Gillies.* Los ojos de Agua, *Bridges,* (*n.* 497.)—*Pentanthus* of Lessing, (*Syn. p.* 397.) is the same as Don's section *Piptostemma* of this genus, and his *P. aculeatus* is closely allied to, if not perfectly the same with, the present species. Lessing says that the leaves are quite glabrous: in our plant, the old ones are so, but the younger ones are covered with a silky pubescence; there is no other difference. The upper part of the stem is tomentose, especially when young.

785. (1.) Nassauvia *Cumingii,* (Hook. et Arn.); glauco-virens glabra, foliis rectis planiusculis lanceolatis acuminatis inciso-serratis acumine longo-serraturisque spinescentibus, nervis haud impressis, spica subrotunda.—*N. suaveolens, Don, in Phil. Mag.* (*Apr.* 1832.) *p.* 389; *in Guill. Arch.* 2. *p.* 465. (*non Lam. Ill. t.* 721.)—Cordillera of Chili, *Cuming* (*n.* 237.) Los ojos de Agua, *Bridges* (*n.* 493.) San Pedro Nolasco, and ascent to the Cumbre on both sides of the Andes of Chili and Mendoza, *Dr. Gillies.* —We have not seen Dr. Gillies' plant: his specimens were named by Mr Don, *N. suaveolens,* and are therefore probably the same with our own.

786. (2.) Nassauvia *pinnigera,* (Gill.); villoso-pubescens, foliis ovato-lanceolatis recurvis spinuloso-serratis, nervis plurimis impressis parallelis, spica oblonga.—*Don, in Phil. Mag.* (*Apr.* 1832.) *p* 390; *in Guill. Arch.* 2. *p.* 465.—Ascent to El Planchon; Andes of Mendoza; *Dr. Gillies.*

787. (3.) Nassauvia *revoluta,* (Gill.); pubescens, foliis ovatis revolutis spinuloso-serratis supra demum glabratis, nervis plurimis impressis parallelis, spica subrotunda.—*Don in Phil. Mag.* (*Apr.* 1832.) *p.* 390; *in Guill. Arch.* 2. *p.* 465. —Ascent to El Planchon, Andes of Mendoza, *Dr. Gillies.*

ACANTHOPHYLLUM. *Hook. et Arn.*

Capitulum 5-florum. *Achenium* erostre, obpyramidatum, dense villosum. *Pappus* uniserialis, paleaceus, æqualis, caducus, paleis 3—5-nis, angustis, subconduplicatis inferne attenuatis, apice ciliatis. *Rachis* ebracteolata, villoso-fimbrillifera. *Involucrum* polyphyllum imbricatum.—Plantæ *fruticosæ.* Folia *difformia, primaria basi dilatata, persistentia, acumine spinosa, secundaria rigida, in ramulis abortivis axillaribus brevissimis congesta, integerrima.*

788. (1.) A. *axillare,* (Hook. et Arn.); foliis primariis subulatis trigonis basi cucullato-vaginatis, secundariis fasciculatis linearibus mucronatis recurvatis, capitulis subternis.—*Nassauvia axillaris, Don, in Phil. Mag.* (*Apr.* 1832.) *p.* 390; *in Guill. Arch.* 2. *p.* 465.—*Triptilion axillare. Lag. Spr. Syst.* 3. *p.* 506.—San Isidro and Mendoza, *Dr. Gillies.*—We prefer erecting Don's second Section of *Nassauvia, l. c.*, or third Section of *Triptilion,* (*Linn. Soc. Trans.* 16. *p.* 223.) into a separate genus, to combining all the three into one. They have each a habit distinct from that of the others, and indeed peculiar to themselves, with the exception of *Nassauvia.* (*N. Cumingii* bearing some resemblance to *Panargyrum glomeratum*), while all the others agree with *Caloptilion. Triptilion* may be easily recognized by its glabrous achenium and pilose rachis; *Acanthophyllum* by its villous achenia and rachis; *Nassauvia* by having both rachis and achenia glabrous.

789. (1.) Triptilion *spinosum,* Ruiz et Pav.—*Don in Linn. Soc. Trans.* 16. *p.* 220. *T. laciniatum, Willd.*—*Nassauvia*

spinosa, Don in Phil. Mag. (*Apr.* 1832.) *p.* 390; *in Guill. Arch.* 2. *p.* 465.—Valparaiso, *Cruckshanks; Messrs. Lay & Collie.—Bridges,* (*n.* 438.); *Mathews,* (*n.* 172.); *Cuming,* (*n.* 572.) Near Los Llanos, between Valdivia and Osomo, *Bridges,* (*n.* 732).

790. (2.) Triptilion *cordifolium.* Lag. *in Bot. Reg. t.* 873. *Don in Linn. Soc. Trans.* 17. *p.* 222.—*Nassauvia cordifolia, Don in Phil. Mag.* (*Apr.* 1832.) *p.* 390; *in Guill. Arch.* 2. *p.* 466.—Valparaiso, *Cuming,* (*n.* 363.)—Reneca and Quinten, *Bridges,* (*n.* 437).—The paleæ of the pappus in this species are much narrower than in *T. spinosum,* and are only ciliated and not bearded on the inside at the apex; so that Lessing's character of the genus (*Syn. p.* 397.) must be considerably modified. The pappus therefore, may be more correctly thus described:—Pappus uniserialis, paleaceus, longus, æqualis; paleis ternis, latiusculis, subconduplicatis, acutis, inferne longe angustatis apice recurvo fimbriatis vel ciliatis intus barbatis vel glabriusculis.—*Nassauvia* has the paleæ very narrow, and ciliato-serrated along the margin; *Acanthophyllum* has them somewhat intermediate, but more resembling *Nassauvia.* We are unacquainted with *T. diffusum,* Don *in Linn. Soc. Trans.* (*Nassauvia* diffusa, Don *in Phil. Mag. l. c.*) or with *T. capillatum* (*Nass. capillata,* Don, *l. c.*) although according to Mr. Don (*in litt.*) this last was collected in Chili, by both Mr. Macrae and Mr. Cuming. All the species, as we have limited the genus, are annuals.

(To be continued.)

ILLUSTRATIONS OF INDIAN BOTANY.

By Dr. Wight & G. A. W. Arnott, Esq.

(*Continued from p.* 21.)

ARGYREIA BRACTEATA.

TAB. III.

PENTANDRIA MONOGYNIA.—Nat. Ord. CONVOLVULACEÆ.

GEN. CHAR. *Sepala* 5. *Corolla* campanulata. *Stylus* 1. *Stigma* capitatum, bilobum. *Ovarium* 2-loculare, 4-spermum. *Capsula* baccata.—Plantæ *vegetationis aspectu pleræque spectabiles, nempe argenteæ, sericeæ, tomentosæ. Omnes Indicæ aut Chinenses.*

Argyreia *bracteata;* caule scandente sericeo-strigoso, foliis cordato-rotundis basi truncatis supra glabris inferne sericeo-hirsutis strigosis, pedunculis petiolos superantibus cymoso-multifloris, bracteis lanceolatis cymam ambientibus, sepalis ovatis acutiusculis.—*Chois. Conv. Ind. p.* 30. *Wall. Cat. n.* 1419. *A. Convolvulus pomaceus? Roxb.—Ipomœa bracteata, Herb. Heyn.*

DESCR. A large twining, branched, milky *shrub,* the young shoots strigose. *Leaves* alternate, on long petioles, which are round, and furnished at the base with two thick oblong glands: *limb* broadly cordato-ovate, rather acute, entire, glabrous, dark shining green above, beneath strigosely hirsute, and somewhat silky. *Peduncles* axillary, rather longer than the petioles, dividing at the extremity into two or three branches, with a sessile ebracteated *flower* in the fork; each branch divides again in the same manner: the solitary flower in the second and all succeeding divisions, furnished with a long, lanceolate, waved, pale-green, hairy *bractea.* In this manner, what was at first an *umbel,* progressively becomes a *panicle,* bearing flowers and fruit in all stages, each of the pedicelled flowers having three *bracteas* closely appressed to the base of the calyx. *Calyx* of five ovate and mucronate hairy *sepals. Corolla* campanulate, externally hairy, of a purplish-white colour; within, near the bottom, deep-purple, becoming paler near the throat: *limb* spreading, cream-coloured. *Stamens* five: *filaments* unequal, enlarged at the base: the enlarged portion thickly covered with viscid, glandular hairs. *Anthers* linear-oblong, deeply cordate at the base. *Ovary* superior, seated in a yellow glandular cup-shaped *nectary. Style* as long as the stamens. *Stigma* two-lobed. *Pericarp* a three to four-seeded *berry,* deep orange-coloured when ripe. *Seeds* imbedded in pulp.

This fine species is frequent in the neighbourhood of Madras, and is usually seen growing in sandy soil, twining most extensively over large trees and hedges, and concealing them with its large umbra-

geous leaves and rich blossoms, which continue open until past mid-day.

Decoctions of the leaves are used by the natives as fomentations in cases of scrophulous enlargements of the joints; the boiled leaves being applied as a poultice at the same time. Its admission into the Hindoo Pharmacopeia is, perhaps, partly owing to the milky juice with which it abounds, most milky plants being esteemed medicinal by them. *Wight.*

Fig. 1. Calyx laid open, and Pistil. 2. Stamens. 3. Section of Fruit:—*magnified.*

(To be continued.)

NOTICE CONCERNING THE LATE MR. DRUMMOND'S JOURNEYS AND HIS COLLECTIONS, MADE CHIEFLY IN THE SOUTHERN AND WESTERN PARTS OF THE UNITED STATES.

Little did I foresee that, in this early stage of the publication of the Catalogue of the valuable Collections made by Mr. Drummond in the less frequented parts of North America, the painful duty would devolve upon me of recording his death, which took place at Havanna, in Cuba, in the month of March of the present year.—Thus have perished, while engaged in the cause of science with a degree of zeal of which history presents few examples, and nearly at the same time, two men in the prime of life, of about the same age, and while on the eve of concluding their researches in countries equally interesting for their natural productions:—I allude to Mr. Douglas and the subject of the present notice.

It will be but common justice to the memory of Mr. Drummond, to offer in this place a brief and general statement, as given by himself, of his researches in Texas, where he has been eminently successful: the account of the plants themselves, as observed on a former occasion, will form the subject of a future paper.

At p. 16 of this volume, I mentioned the circumstance of Mr. Drummond's arrival in Texas; and the following extracts from his letter, dated "Town of Velasco, mouth of the Rio Brazos, Texas," as well as those which follow, cannot fail to be found interesting by our readers:—

"We had a favourable passage from New Orleans to this place, and on our arrival found the river so high that it occasioned a delay of a week before we could reach the town of Brazosia, which is only about twenty miles up the river. The country, in general, is low and swampy, and ever since we came here, it has been flooded by the river: it consists almost entirely of prairies, except that the water-courses are bordered by woods, consisting chiefly of Live Oak and Poplar, with an under-growth of Carolina Cherry. I remained a few days at Brazosia, and having an opportunity of sending by a vessel to New Orleans, I despatched the specimens which I collected without delay. Never having seen any part of the sea-coast in this neighbourhood, I determined on returning to the mouth of the Rio Brazos, and commencing my operations there. I accordingly came back to this place, which nearly proved fatal to me, for when I had been here about ten days, and completed a collection of the few plants then in flower, and made arrangements for going to Galveston Bay in the same vessel that brought me hither, I was suddenly seized with cholera. Though ignorant of the nature of the disease and the proper remedies, I fortunately took what was proper for me, and in a few hours the violent cramps in my legs gave way to the opium with which I dosed myself. In the course of the same day the Captain and his sister were taken ill and died, and seven other persons died in two or three days—a large number for this small place, where there are only four houses, one of which was unvisited by the disease. All the cases terminated fatally, except mine, and always in ten or twelve hours, save one person, who lingered a few days. The weather was particularly cold and disagreeable for more than a week before the cholera appeared; indeed the air here is constantly saturated with moisture, so as to render the

proper preservation of specimens a work of absolute impossibility. I am almost afraid that the accompanying collection, which I have taken the utmost pains to dry sufficiently, may not reach you in good order. My recovery from cholera was very slow. When my appetite returned, I was nearly starved for want of food, the few individuals who remained alive being too much exhausted with anxiety and fatigue to offer to procure me any thing. I am now, thank God, nearly well again, though my face and legs continue much swollen, a symptom which was very violent when I first began to recover, and is gradually wearing off. As far as possible, I am endeavouring to replace the specimens which were spoiled during my illness, and have just packed up the whole, consisting of about an hundred species of plants, and as many specimens of birds, consisting of about sixty species, some snakes, and several land-shells. Two of the latter inhabit the salt-marshes, but are not aquatic; for when the ground becomes flooded, they take refuge on the tops of grasses and shrubs. Among the plants are several which I would particularly recommend as deserving of notice for their beauty: two are species of *Coreopsis*,[1] one with flowers twice as large as those of *C. tinctoria*, and extremely handsome. There is also a syngenious plant, allied to *Rudbeckia* (probably the beautiful var. of *Galardia bicolor*, fig. at t. 3368, Bot. Mag.)—the blossoms are copper-coloured, and the whole rises to about a foot high, and covers a diameter of three or four feet: I may safely say, that I have seen more than a hundred flowers open on it at the same time. Also a fine procumbent *Œnothera*, much like *Œ. macrocarpa*, (*Œ. Drummondii*, Hooker in Bot. Mag. t. 3361,) and a charming *Ixia*, of which I send roots. The seeds of the other plants will, I hope, arrive in good order. I trust that my collection of bird-skins from Louisiana has reached you safely. Some, which were injured by the too large size of the shot which I procured there, I only send, to prove what species inhabit the country. The want of my tent and the chief part of my ammunition, which I was obliged to leave at St. Louis, proves a serious inconvenience to me. To-morrow I intend making an attempt to reach Brazosia again, but the greater part of the journey is waist-deep in mud and water; thence I shall go to San Felipe, whither my baggage is already sent, sixty miles beyond Brazosia. Above the latter place, the river is not navigable for boats, so that my luggage must go in waggons. I feel anxious about my collections, which I leave here, to await a vessel going to New Orleans; but there is no help for it, and from the interior of the country it is still more difficult to obtain conveyances, the charge for freight being so enormous as to exceed the value of the collections. The cost from Brazosia to New Orleans is forty cents. per foot, and the amount of my passage and luggage hither was fifty dollars. Boarding averages six dollars a-week, and that of the roughest kind. It is, however, so long since my hope of being able to realize any thing more than will cover my expenses has been dispelled, that I am not disappointed, and my only desire is to remunerate those who have contributed to my outfit, and by the collections of Natural History specimens which I shall send home, to give a good general idea of the productions of this part of the world. Of the genera *Pentstemon* and *Sabbatia* (?), which are beautiful and numerous, I send many specimens and seeds; also of a lovely *Rudbeckia*, which is a great ornament to the prairies here. I could ask a thousand questions about my plants, for I am shut out from all information; though Pursh's American Flora is among my luggage, I can hardly get a sight of it. You may form an idea of the difficulties I have to encounter in this miserable country (more miserable, however, as to its inhabitants than in any other respect) when I tell you, that all the bird-skins I sent

[1] Two fine species of the Genus, and probably the same as here alluded to, have flowered in the Botanic Garden of Glasgow, from seeds sent by Mr. Drummond, and will soon be given in the Botanical Magazine.—ED.

you were removed with a common old penknife, not worth two cents., and that even this shabby article I could not have kept had the natives seen any thing to covet in it; and that I am obliged to leave behind my blanket and the few clothes that I have brought, because of the difficulty of carrying them, though I feel pretty sure I shall never see them again. These trifles I only mention to give you some idea of my present situation; they do not affect me much, except as preventing me from pursuing the objects of my journey with the success that I could wish. I have not yet positively fixed my future plans, but I wish to go westward from San Felipe, and crossing the Rio Colorado, to trace it to its sources, if it be practicable."

San Felipe de Austin, Aug. 3, 1833.

"Early in May last, I put up a box of specimens for you, while I was staying at Velasco, at the mouth of the Rio Brazos; and I then stated my intention of going to Brazosia, and proceeding higher up the country. This plan I accomplished, though in an unexpected manner, for the river had risen to a height so unprecedented, that a boat brought me across the prairies, which were flooded to a depth of from nine to fifteen feet! On arriving at Brazosia, I found the whole town overflowed, and the boarding-house floor was covered with water a foot deep. I determined, therefore, that my stay should be as short as possible, and took the first opportunity of a boat to Bello, where I was so happy as to see some dry land; a commencement of the prairie country, which extends uninterruptedly to the West. I had been very uneasy about my luggage, which preceded me, and I feared it had been deposited in the stowage, where the water stood six or eight feet deep, and much property had been consequently destroyed: but all was safe, and after remaining a few days at Bello, to recruit my strength for the journey, I commenced my walk to this place, collecting what plants I could find by the way. As it would be impossible to give you a detailed account of my adventures in this letter, I will endeavour rather to convey to you some idea of the produce of the country. The collection which I left at the mouth of the river, amounted to one hundred species, and my list now contains three hundred and twenty, which are packed in excellent order: also, seeds, roots, and bulbs, with some bottles of reptiles. I hope these may reach Europe safely; but I am not without fears on that score, as the cholera is raging in this neighbourhood, and has nearly depopulated Brazosia. My health continues good, since I recovered from that disease, although I am necessarily much exposed from the nature of my pursuits; the weather, too, is extremely hot, probably nearly 100° of Farenheit. From this place, I intend to proceed immediately to a distance of about forty miles, near the source of the Brazos, when I shall be nearly half way to the Colorado river; but I have no prospect except of carrying the requisite stock of paper myself, together with a change or two of linen, which this warm climate renders absolutely necessary. Now that you are somewhat apprized of the nature of this country, I trust you will give me your advice as to my movements. If you think that the risk will be adequately repaid, I am most willing to proceed, nay, I am anxious to do so, that I may be able to communicate a good general idea of the Botany of Mexico.

"About one-third of the plants collected on my route, were destroyed by the overflowing of the river. Vegetation is now recommencing, but I never witnessed such devastation; it has extended even two hundred miles higher up the river than this place. You will perceive that it is impossible for me to collect any thing like a given number of species in a certain time, though vegetation scarcely receives any check, even during this winter, in this climate."

San Felipe de Austin, Oct. 28, 1833.

"I have this day forwarded a box of specimens, together with some growing plants, and several bottles, containing the fruit of a shrub, and some curious lizards and snakes. Amongst the roots is one, ap-

parently of *Amaryllis*, from which I anticipate a curious inflorescence; and in the packets of seeds, are several very choice plants, not excelled in beauty by any species now in cultivation. The intention of pursuing my way westwardly, which I mentioned in my last, was carried into effect, and I returned here about ten days ago. The journey has produced about one hundred and fifty species of plants, bringing up my Texas list to nearly five hundred; and I have sent numerous samples of almost every kind. This collection may give you some idea of what might be expected, if I could reach the mountains; my prospect of effecting this would be, however, very precarious, even if ample means were within my reach, as the Indians have been very troublesome on the frontiers, and have killed several Americans on the Colorado river this autumn. During the approaching winter, I think of visiting the sea-coast: probably Harrisburg, near Galveston Bay, whence I may forward such things as I can collect, to New Orleans. I do not expect to make a very great addition to my number of plants, but rather anticipate that they will be of a different class; for instance, the *Cacti*, of which I have got but three, are said to be numerous. After spending next summer in Texas, I should wish, before returning to Scotland, to visit the extreme western parts of Florida. There are no shells in the Brazos—it is always muddy, like the Rio Colorado. Since commencing this letter, two or three nights of frost have destroyed every vestige of vegetation. There are a great many *Gramineæ* in this collection, and you may, perhaps, find it difficult to assign good specific characters for them; still, I can assure you, once for all, that I have not marked any as distinct except I am perfectly convinced that they are so."

San Felipe de Austin, Apr. 24, 1834.

"In my last letter, written in October, I mentioned my plan of wintering on the sea-coast, which I accordingly did, in Galveston Bay; but, I am sorry to state that my principal object has, to a great degree, been defeated. I was in hopes of being able to collect a goodly number of birds there; but, from some unknown cause, there were scarcely any birds in the bay during the past winter. I spent the month of January in Galveston Island, said to be the greatest resort of sea-fowl on the whole coast, and with difficulty could procure enough to eat—the island being uninhabited, and the weather so bad that it rained incessantly for three months, accompanied by a dense fog. After remaining in the bay till the 10th instant, expecting the arrival of the migratory birds, I returned hither with one hundred and eighty[1] specimens; fifty kinds of them had not been sent before—they are in better order than any I had previously procured. It is my desire this summer, to advance as far into the interior as possible; but several difficulties lie in the way. The Indians are becoming very dangerous, and news has just arrived of the murder of a surveying party, consisting of Capt. Johnston and nine men, at one hundred and fifty miles above this place. This is another instance of the mercy of Providence in sparing my life, as I had designed to join this very party, if I could have arrived from the coast in time. The necessity of having all *the luggage carried,* is another great hindrance to my movements; I may state that I had to navigate an old canoe from Galveston Bay to Harrisburg, a distance of from eighty to one hnndred miles, all by myself, and with hardly any provision; for, owing to the failure of last year's crops, famine is threatening the inhabitants of that district: and when arrived there, I was obliged to hire a cart and oxen to come to this place, for which I paid sixteen dollars. But amidst all these difficulties, there is one blessing, for which I cannot be too thankful—I enjoy excellent health; and, I can assure you, that it has been tried with such fatigue as would have broken down thousands.

"I have added a few plants, lately, to my stores, some of them very handsome; especially four or five species of *Phacelia*, and two of *Coreopsis*, with a bulbous-

[1] This Collection is now in the possession of the Earl of Derby.

rooted plant, like an *Ixia*, but hexandrous. I am glad to find that you have figured the species of *Nuttallia*,[1] which I sent before; it is a very fine flower. I have also seen another, apparently quite new, and equally beautiful; it is perfectly smooth, inclining to glaucous. This is the worst country for insects I ever saw; the custom of burning the prairies probably accounts for it. I have procured many specimens of a curious Lizard, found about Galveston, but I detain them to go with the others from New Orleans."

San Felipe de Austin, Sept. 26, 1834.

"You are, doubtless, anxious to hear from me, no opportunity of forwarding any letters to you having offered since April last, when I stated my intention of proceeding to the Upper Colony, as soon as possible. This I did, and had reached the Garrison, one hundred miles above this place; and made arrangements for joining a band of friendly Indians, who were going to hunt near the sources of Little River, one of the tributaries of the Rio Brazos, when the news that a packet of letters was here, which might contain instructions for my movements, reached me, and I returned hither to take them up, and, consequently, lost the chance of accompanying the Indians. I am sorry to say that it is perfectly impracticable to accomplish your plan for my reaching either the mountains or Santa Fè. This settlement does not extend to within one hundred miles of the former, and the intervening country is full of hostile Indians, who often enter the colony, killing the inhabitants, and stealing their horses and cattle; so that a band of a dozen men are requisite to protect any traveller who should venture among them. As to Santa Fè, it is at an immense distance from this place, and there is no intercourse. From the towns of the Interior, there is communication sometimes with it; but the best way of going thither is from St. Louis, or from Tampico, or Matamozos, which are frequently visited from New Orleans. The name of *Linum Plotzii*, (*Hook. MSS.*) had better, perhaps, be changed to *Berlandieri*, who was the person who discovered it. *Psoralea arenosa* is, in this collection, in fruit; with the two *Coreopsides*. I am sorry to say that I have found no insects, as they are very scarce in these and all the prairie countries, owing to the frequent burning of those lands. The whole country, from the Rio Colorado to the Guadaloup, a distance of eighty or ninety miles, is as destitute of verdure as the streets of Glasgow, except some small patches along the creeks. After returning to San Felipe, for my letters, as I before stated, I joined a waggon which was bound for Gonzales, in Gaudaloup, one hundred miles distant; but having exposed myself to the burning sun, in the middle of several days, I was seized with bilious fever, which was nigh proving fatal, and has been followed by violent boils and a disease, here called *Felon*, in my thumb. The latter rendered my hand useless for two months, and I caused the place to be opened, and several bits of bone to be removed; and some other pieces have since worked out, so that I have been threatened with the loss of my thumb; but I hope to escape this disaster. Were it practicable for me to reach the mountains, I could easily double the seven hundred species, which is the number of what I have collected in Texas."

This is the last letter that was received from Texas, and the Collections made there, mentioned in the two following letters, were all dispatched from New Orleans and proved exceedingly rich and valuable, both in what concerns the number and the rarity of the species, no less than the excellency of their preservation.

New Orleans, Dec. 20, 1834.

"I arrived here yesterday, from Texas, bringing all the specimens I had collected last season, and a box which had been omitted to be forwarded, containing some which had been gathered during the preceding year. I am unable to ascertain at present, whether the latter are in good preservation, as they are but this moment

[1] Nuttallia *Papaver*: see Bot. Mag. t. 2387.

received from the Custom House, and the vessel that takes my letter sails to-day. My last opportunity of writing to you was from San Felipe, in October, and it is needless to recapitulate what I then said; my Texas collection of plants now amounts to seven hundred species. If practicable, I shall proceed immediately to Florida, going northward, as the season advances. Perhaps I may reach Baltimore, whence I can take shipping for Europe; but I hope to receive letters from you in a few days, which will decide my movements. I am sorry to say that I have had a violent attack of diarrhæa, accompanied with such a breaking out of ulcers, that I am almost like Job, smitten with boils from head to foot, and have been unable to lie down for seven nights: but, as I am a little better, I hope to be well in a short time."

New Orleans, Christmas Day, 1834.

"I wrote to you a few days since, mentioning my arrival, and the difficulty I was in for want of instructions how to act; but the very next day I received your kind letter, which enables me to arrange my plans for next summer. These, following your desire, would be that I should spend next season in Mexico, and endeavour to reach Santa Fè, are, to get to some of those Spanish towns in the interior which trade occasionally with Santa Fè, either by the way of Red River or otherwise. The journey would be very long, and among hostile Indians all the way; however, it might perhaps be accomplished by joining the fur traders at St. Louis, who go annually within eighty or a hundred miles of it, namely, to Tores. This plan would occupy at least two years, as the traders never start till May, before which time their horses would find no grass. I am becoming very anxious to see my family, and must, in consequence, endeavour to be in Scotland by this time next year, taking Florida, Georgia, and the Carolinas in the way; where, if I cannot find many new plants, I hope to be able to procure better specimens of such as are already sent. The question naturally arises as to what I shall do at home, and as I do not think it would be advisable for me to remain there, I have determined, if sufficient funds can be obtained, to return with my family to Texas, where I can buy a league of land for one hundred and fifty dollars, and if I can add the purchase of a dozen cows and calves, which cost ten dollars each (that is, the cow and calf), a few years would soon make me more independent than I can ever hope to be in Britain. I should then have an opportunity of exploring the country from Texas to the city of Mexico, and west to the Pacific, which would occupy me seven years at least. I am perfectly satisfied of the novelty which such a plan would afford. I have been given to understand that the Mexican Government wishes particularly to have the Natural History of its territories examined, and would liberally reward the person who did it. Now I am not vain enough to expect much remuneration for what I could do, still, with your assistance, I think I might, in the course of two or three years, publish a tolerably complete catalogue of the plants of that country, and, were proper application made, a grant of land would certainly be given me. These plans I mention, that you may kindly consider them at your leisure. In the collection now sent is a box, containing several species of *Cacti*, some very interesting. Three are allied to *Mammillaria*, one to *Melo-cactus*, and several to *Opuntia*. They are all from Gonzales. I do not recollect the tetradynamous plant you describe (a new *Streptanthus*.) The *Maclura*, though I have never seen it, grows so abundantly about Myadoches, as to render several of the ponds and stagnant waters unfit for use, on account of its bitter fruit and foliage falling into them. By the 1st of January I expect to leave this place, but am not decided on the exact route; if a vessel be going to Key West, or St. Augustine, on the St. John's, I shall probably take a passage by it. I find it would be absolutely necessary for me to return to Britain, in order to purchase a stock of necessaries, clothing, instruments for collecting insects, &c. Upon such articles as knives and forceps, a person who could af-

ford to lay out two or three hundred dollars, would make cent. per cent. here, and a thousand per cent. on many things, so that the journey would cost nothing. Pray write to me at Charleston; you shall hear from me thence, if not sooner."

"*Dec. 28th.*—Since writing the foregoing I have engaged a passage in a vessel about to sail for Apalachicola, in Florida, in two days from this time. My health is better, though one of my thumbs is still unhealed, so that I have only the use of one hand."

The next and last letter I ever received from this praiseworthy naturalist, was from the place just mentioned.

Apalachicola (Florida), Feb. 9, 1835.

"From this place, where I have been rather more than a month, I send to you, *viâ* Liverpool, two boxes of specimens, some of which, I hope, will prove interesting. This is the most barren spot I ever saw—nothing but sand for a hundred miles back into the country; still I have procured *Mylocarium ligustrinum, Ceratiola ericoides,* and a new species of *Pinguicula,* which I should have supposed to be *P. nana* of Pursh, but that it is quite villous. Also *P. elatior,* and a species of *Gentian* not in Pursh, with white flowers and leaves like those of *Pneumonanthe,* but smaller. Of *Sarracenia variolaris,* I send more than a hundred living plants—it does not agree with the description of Pursh, as *smaller* than *S. flava,* for it is rather larger. There are likewise plants of an *Epidendrum* (*E. conopseum,*) which grows parasitically on the Live Oak and *Magnolia grandiflora.* This Genus had not hitherto been found in the United States, and I trust the specimens will grow and flower well with you. I also send plants of a *Cactus* (*C. fragilis,* Torrey?), of the *Cabbage Palm,* and another species, with several other plants of great interest to the cultivator, and seeds of many kinds: also a box of berries packed in sand, four kinds of evergreen *Ilex,* of *Mespilus, Prinos,* and a shrub which I do not know. There is no means of getting from this place by land to the extreme south of Florida, which I chiefly wish to visit, therefore I shall probably go to Havanna, whence there are always vessels for Key West; for I am unwilling to go up the river to Columbia, in Georgia, as it would cut off the most interesting portion of Florida. My health is tolerable, though I am much pained by a severe ulcer on one leg, for which the *Saw Palmetto* is but an indifferent doctor. There are neither birds nor insects in this desert, but perhaps Key West may afford some; and, if possible, I shall visit St. Augustine and Savannah, in Georgia. There are three kinds of *Yucca,* unlike any species with which I am acquainted, in the box. The weather has been extremely cold for some days, ice having formed in one night strong enough to bear my weight. I sail this evening for Havanna."

Of the nature of the illness which so soon terminated Mr. Drummond's useful labours, and his life, we are not yet informed. Some fears for his safety, I confess, came across my mind when, in the end of June of this year (1835) I received from Cuba, *viâ* Hamburgh, three boxes, which, instead of being filled with plants, as I had anticipated on their arrival, only contained his little personal property, clothes, bedding, &c.; together with a very few ill-dried plants and insects, unaccompanied by any letter or even invoice. Still, I flattered myself with the hope that Mr. Drummond might have left Havanna for South Florida in great haste, and dispatched to Scotland whatever luggage was not absolutely necessary to him in a country where the means of conveying were by no means easy or cheap, and that his intention was to write to me from some town in Florida. But all these hopes were destroyed, and my worst fears realized, by the arrival of a letter which H. B. M.'s Consul at Havanna, C. D. Tolmie, Esq., had the kindness to write to me, dated 11th March, 1835, enclosing a certificate of Mr. Drummond's death and a statement of his effects being forwarded to me *viâ* Hamburgh and Leith: and referring me for particulars to another letter, which had been

dispatched by an earlier packet, but which has, unfortunately, not yet reached its place of destination.

But it is time to leave this painful subject and to proceed to the more agreeable task of continuing the list of Mr. Drummond's discoveries in the United States previous to his visit to Texas, from p. 26 of this work.

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308. Proserpinaca *pectinata*, Lam.—N. Orl. (*n.* 112.)—Apparently only a var. of the preceding.

309. Myriophyllum *heterophyllum*, Mich. —N. Orl. (*n.* 113.)—The upper leaves in our specimens are lanceolate, as described by Elliott, not ovate, as described by Michaux, of which state, however, I possess specimens from Mr. Greene.

310. Myriophyllum *scabratum*, Mich.—Ohio.—This entirely agrees with specimens under the same name, which I have received from Mr. Greene, gathered in S. Carolina.

311. Callitriche *heterophylla*, Ph.—N. Orl. (*n.* 1140).—Probably not different from our *C. verna*.

312. Callitriche *terrestris*, Raf.—N. Orl. (*n.* 115.)

Obs. Mr. Nuttall remarks, that the *Hippuris vulgaris* of the United States is different from the Europæan plant of that name, in having only six leaves in a whorl instead of about eight. A specimen I possess from Quaker's Bridge, gathered by Mr. Greene, confirms this opinion; the leaves are from four to six, and *remarkably* acuminated. The *H. vulgaris*, however, of the British Settlements of North America, is the same as that of Europe.

LYTHRARIEÆ. *Juss.*

313. Ammannia *latifolia*, L.—St. Louis. —The leaves of this are three to four inches long, truncate, and almost hastate at the base. It seems identical with the West Indian species, of which I have specimens from Martinique.

314. Ammannia *humilis*, Mich.—Jacksonville.

315. Lythrum *alatum*, Ph.—N. Orl. 1833. —St. Louis.

316. Lagerstrœmia *Indica*, L.—N. Orl. 1833 (*cult.*).

MELASTOMACEÆ. *Juss.*

317. Rhexia *Mariana*, L.—Covington. N. Orl. (*n.* 116.)

318. Rhexia *Virginica*, L.—Covington.

319. Rhexia *ciliosa*, Mich.—Covington.

320. Rhexia *glabella*, Mich.—Covington. N. Orl. (117.)

321. Rhexia *lutea*, Mich.—N. Orl. (*n.* 118.)

322. Rhexia *angustifolia*, Nutt.—Covington.

CUCURBITACEÆ. *Juss.*

323. Cucumis *Citrullus*, DC.—St. Louis.

324. Melothria *pendula*, L.—N. Orl. (*n.* 120.)

PASSIFLOREÆ. *Juss.*

325. Passiflora *lutea*, L.—Covington.

326. Passiflora *incarnata*, L.—N. Orl. (*n.* 121.)

PORTULACEÆ. *Juss.*

327. Portulaca *oleracea*, L.—N. Orl. (*n.* 122.)

328. Claytonia *Virginica*, L.—Pennsylvania.

PARONYCHIEÆ. *St. Hil.*

329. Anychia *dichotoma*, Mich.—*Queria dichotoma, L.*—Alleghanies.—*β. capillacea.—Torrey.*—St. Louis.

CRASSULACEÆ. *D C.*

330. Sedum *ternatum*, Mich.—Pennsylvania.

331. Penthorium *sedoides*, L.—St. Louis. N. Orl. 1833.

FICOIDEÆ. *Juss.*

332. Sesuvium *Portulacastrum*, L.—N. Orl.

GROSSULARIEÆ. *D C.*

333. Ribes *Cynosbati*, L.—Alleghanies.

SAXIFRAGEÆ. *Juss.*

334. Itea *Virginica*, L.—St. Louis. N. Orl. (*n.* 123.)

335. Hydrangea *quercifolia*, Bartr.—Covington.

336. Saxifraga *Virginiensis*, Mich.—Pennsylvania.

337. Mitella *diphylla*, L.—Pennsylvania.

338. Tiarella *cordifolia*, L.—Alleghanies.

UMBELLIFERÆ. *Juss.*

339. Hydrocotyle *umbellata?* L.—N. Orl. (*n.* 124.)—This does not accord with the H. *umbellata* of the American botanists, nor do I know what species to refer it to.

It is densely creeping, almost cæspitose. Leaves half to three-quarters of an inch long, orbiculari-reniform, with a deep sinus, near to which the petiole is inserted, distinctly lobed; with petioles about as long as the leaves are broad. Peduncles about the length of the petiole, having eight to ten flowers at the extremity, some of which are sessile, some umbellate. The inflorescence is very different from that of *H. interrupta,* of which I have numerous specimens from the Mississippi, gathered by M. Tainturier.

340. Hydrocotyle *repanda,* Pers.—Covington.—Scarcely different from *H. Asiatica, L.*

(The rare *Erigenia bulbosa,* Nutt. (*Hydrocotyle composita,* Ph.), is found in rich alluvial soils of the larger streams of Kentucky. It is the "*Sison pusillum*" of Voltz's "Pittsburg Plants.")

341. Sanicula *Marylandica,* L.—N. Orl. (*n.* 125.)—Each capitulum consists of three globose, muricated fruits, of which the two lateral are horizontal. Dr. Short finds a very remarkable variety, if it be not a distinct species, with the fruit much larger, ovate, and very acute, the two lateral ones deflexed. The leaves too are broader and less divided. Can this be the *S. Canadensis* of Linnæus? No one, that I am aware of, but Dr. Short has noticed the remarkable difference in the fruit.

342. Eryngium *Balduini,* Spr.—*E. gracile, Nutt. non LaRoch.*—N.Orl. (*n.*126.)

343. Eryngium *virgatum,* Lam.—*E. ovalifolium, Mich.*—Covington.—I possess the same species from Dr. Torrey, gathered in Alabama, and from Dr. Darlington, gathered in N. Carolina.

344. Eryngium *aquaticum,* L.—Covington. N. Orl. (*n.* 127.)

345. Cicuta *maculata,* L.; *var.* foliolis latioribus.—Covington.

346. Zizia *aurea,* Koch.—St. Louis.—*β. acuminata. D C.*—Pennsylvania.

347. Zizia *cordata,* Koch.—N. Orl. (*n.* 128.) Alleghanies.

348. Zizia *integerrima,* D C.—Alleghanies.

349. Helosciadium *leptophyllum,* D C.—N. Orl. (*n.* 130.)—*var. majus,*—N. Orl. (*n.* 129.)

350. Discopleura *capillacea,* D C.—N. Orl. (*n.* 131.)

351. Cryptotænia *Canadensis,* D C.—St. Louis.

352. Sium *latifolium,* L.—N. Orl. (*n.*132.)

353. Sium *lineare,* Mich.—N. Orl. 1833.

354. Thaspium *Barbinode,* Nutt.—Alleghanies. Pennsylvania.

355. Ferula *Drummondii,* Hook. et Arn.; glabriuscula, caule tereti erecto ramoso parce folioso, foliis radicalibus longe petiolatis bi- triternatim pinnatifidis, segmentis lato-linearibus incisis, caulinis sessilibus, involucris nullis, involucellis setaceis.—An *F. Canadensis,* L.?—N. Orl. (*n.* 134.)—My solitary specimen of this is far from being in a perfect state. The foliage is withered, and the flowers are entirely gone. The stem, nearly two feet high, is sparingly leafy, purplish. The fruit has a broad, elevated, spongy margin, the disk marked with three slightly elevated lines.

356. Tiedemannia *teretifolia,* D C.—*Sium teretifolium, Ell.*—*Œnanthe Carolinensis, Pers. Ph.*—Covington.

357. Archemora *denticulata,* D C.—Jacksonville.—Perhaps not distinct from *A. rigida.*

358. Trepocarpus *Æthusa,* Nutt.—N. Orl. (*n.* 133.)—This is in all probability the *T. Œthusa* of De Candolle, which also comes from Louisiana.

359. Daucus *pusillus,* Mich.—N. Orl. (*n.* 135.)

360. Osmorhiza *longistylis,* D C.—Pennsylvania.

361. Chærophyllum *Tainturieri;* subhirsutum, caule debili, foliis decompositis, foliolis pinnatifidis segmentis oblongis, umbellis lateralibus terminalibusque nunc sessilibus, radiis paucis, involucello pentaphyllo, foliolis ovatis obtusis, fructibus lineari-oblongis attenuatis.—*α.* fructibus glabris.—N. Orl. (*M. Tainturier.*)—*β.* fructibus pubescentibus.—N. Orl. (*M. Tainturier.*) *Drum. n.* 136. Natches. *C. S. Parker, Esq.*—Closely as this is allied to the *C. procumbens* in its habit and foliage, it is unquestionably a distinct species, judging at least from all that I have received from the more northern states, from Pennsylvania (*Mr. Schweinitz, Mr. Townsend*), and from Kentucky (*Dr. Short* and *Mr. Greiswold.*) Their plant has the fruit oblong, whereas our Mississippi plant has it decidedly acuminated into a kind of beak; so that were it not for the distinct ridges, I should refer it to *Anthriscus.* The fruit is sometimes rather densely pubescent, at other times glabrous and even shining. The styles, though short, are longer than in *C. procumbens,* and much more distinct upon the fruit.

ARALIACEÆ. *Juss.*

362. Panax *quinquefolium,* L.—Wheeling.

363. Panax *trifolium*, L.—New York and Pennsylvania.
364. Aralia *racemosa*, L.—Covington.

HAMAMELIDEÆ. *Br.*

365. Hamamelis *Virginica*, L.—N. Orl. 1833. (*n.* 137.) Pennsylvania.

CORNEÆ. *D C.*

366. Cornus *alba*, L.—N. Orl. (*n.* 138.)
367. Cornus *florida*, L.—Pennsylvania. N. Orl. (*n.* 139.)

LORANTHACEÆ. *Rich. et Juss.*

368. Viscum *flavescens*, Ph.—N. Orl. (*n.* 140.)

CAPRIFOLIACEÆ. *Juss.*

369. Sambucus *Canadensis*, L.—Covington.
370. Sambucus *pubens*, Mich.—N. Orl. (*n.* 141.)—β. foliolis latioribus.—N. Orl. (*n.* 144 *bis.*)
371. Viburnum *Lentago*, L.—Alleghanies.—This has the leaves much and suddenly acuminated.
372. Viburnum *prunifolium*, L.—Pennsylvania.
373. Viburnum *nudum*, L.—N. Orl. (*n.* 142.) 1833.—Covington. Jacksonville.
374. Viburnum *dentatum*, L.—N. Orl. (*n.* 143.)
375. Viburnum *pubescens*, Ph.—N. Orl. (*n.* 144.) Covington (*in fr.*)
376. Triosteum *perfoliatum*, L.—Alleghanies.—*Lonicera sempervirens, Ait.* β. foliis oblongis. *Sims, Bot. Mag. p.* 1753.—N. Orl. (*n.* 145.)

RUBIACEÆ. *Juss.*

377. Hedyotis *glomerata*, Ell.—N. Orl. (*n.* 150.)
378. Hedyotis *Boscii*, D C.—N. Orl. (*n.* 151.)—The same plant I have received from M. Tainturier. It turns black in drying.
379. Houstonia *cærulea*, L.—Pennsylvania.—N. Orl. (*n.* 148.)
380. Houstonia *patens*, Ell.—N. Orl. (*n.* 149.)
381. Houstonia *tenuifolia*, Nutt.—St. Louis.
382. Houstonia *longifolia*, Willd.—*H. angustifolia, Mich.*—St. Louis.
383. Houstonia *purpurea*, L.—Ohio.—This and the two preceding are probably varieties of one and the same species.
384. Houstonia *rotundifolia*, Mich.—*Anotis rotundif., D C.*—N. Orl. (*n.* 147.)
385. Mitchella *repens*, L.—N. Orl. (*n.* 146.)
386. Cephalanthus *occidentalis*, L.—N. Orl. (*n.* 1833.) Ohio. St. Louis.
387. Spermacoce *tenuior*, L.—N. Orl. (*n.* 152 *bis.*) 1833.—St. Louis.
388. Diodia *teres, Walt.*—N. Orl. (*n.* 152.)—St. Louis.
389. Diodia *tetragona*, Walt.—*D. Virginica, Mich.*—Covington.
390. Galium *micranthum*, Ph.—Covington.
391. Galium *uniflorum*, Mich.—Covington.
392. Galium *trifidum*, Ph.—N. Orl.—(*n.* 153.)
393. Galium *latifolium*, Mich.—St. Louis.
394. Galium *tinctorium*, L.—Alleghanies.

VALERIANEÆ. *Juss.*

395. Valeriana *pauciflora*, Mich.—Alleghanies.
396. Fedia *radiata*, Vahl.—Alleghanies.
397. Fedia *olitoria*, Mœnch.—N. Orl. (*n.* 154.)

COMPOSITÆ. *Juss.*

398. Cnicus *arvensis*, Willd.—Covington.—There are two states of this species, one with small, very spinescent leaves, the other with larger, less spinous, and thinner ones: approaching in the foliage to *C. muticus*, but having much smaller flowers than that species, with the scales of the involucre all furnished with an acicular patent spinule.
399. Cnicus *muticus*, Willd.—Jacksonville.
400. Cnicus *discolor*, Willd. St. Louis.—N. Orl. (*n.* 160. Flowers young).—β? foliis lato-lanceolatis subintegris.—St. Louis.—Of this var. the involucre and uppermost leaves resemble those of *C. discolor*, but the majority of the cauline leaves are oblongo-lanceolate, ciliato-spinescent at the margin: still I am of opinion it is only a state of that plant, which Nuttall describes as variable in its foliage.
401. Cnicus *horridulus*, Pursh.—N. Orl. (*n.* 161.)—This agrees in every particular with the *Cirsium glabrum* of De Cand., of which I have specimens gathered in the Pyrenées, both from Mr. Bentham and from the Unio Itineraria. Mr. Bentham unites it with *Cnicus spinosissimus* (*Cirsium*, D C.)
402. *Cnicus Virginianus*, Nutt.—Covington.
403. Centaurea *Americana*, Nutt. *in*

Journn. Acad. Phil. v. 2. p. 11.—Covington.—Mr. Nuttall discovered this plant "on the banks of streams and in denudated, alluvial situations, throughout the plains or prairies of the upper part of Arkansa territory." That author considers it very nearly allied to *C. Austriaca* of Europe; but its characters are totally different, and Mr. Don has even raised it to the rank of a Genus (*Plectocephalus, Sw. Br. Fl. Gard. 2d Ser. p.* 51.); other three species enumerated by Mr. Don are natives of Chili: so that the groupe is exclusively one of the New World, and the present appears to be the only species of *Centaurea* which is an aboriginal native of North America.

404. Vernonia *Noveboracensis,* Willd.—St. Louis.

405. Vernonia *prœalta,* Willd.—Covington. St. Louis.—var. *β.* foliis ovato-lanceolatis supra scabris subtus involucrisque pubescenti-tomentosis. — St Louis.

(To be continued.)

ON THE VEGETATION OF ETNA.

(Being Extracts from a Memoir on this subject, entitled "*Uber die Vegetation am* Ätna, *von Dr. R. A. Philippi,* published in the 7th volume of the Linnæa, p. 727, &c.)

This celebrated volcanic mountain, situated in lat. 37° 44′, and reaching to a height of 10,212 Paris feet, according to the measurement of Dr. Philippi and his companions, Professor Fr. Hoffman and Mr. Von der Linth, is separated from the chain of mountains through the North of Sicily by the low valley of Fiume Cantara, on the West from the hills of Cesarò and Contorbi by the Simeto, the largest river of Sicily: it is bounded on the East by the sea, and on the South by the plain of Catania. Its form is that of an obtuse cone, which, measured from North to South, is twenty-six Italian, or six geographical miles, and from East to West twenty Italian, or five geographical miles; and its elevation, in proportion to the longest diameter of its base, is as one to fourteen and a half, and to the shortest, as one to eleven. The plane surface is about twenty-three and a half square miles (German), and the whole surface is covered with pumice and ashes, with here and there volcanic tufa. Only in a few places are some sand-stone hills, as at Bronte and Maletto, and some of clay near Catania, which form islands on the black sea of lava.

Etna, in the opinion of Dr. Philippi, does not admit of more than three regions of vegetation.

1. The *cultivated region,* extending from 0—3,300 feet.
2. The *woody region,* from 3,300—6,200 feet; and
3. The *alpine region,* commencing at 6,200 feet. And these nearly accord with the limits long marked by the inhabitants —Regione piedemontana, de Boschi, et discoperta.

1. The *cultivated region.* This commences immediately with the sea-line, and reaches to an elevation of 3,300 feet, where the cultivation of the Vine ceases. It is this zone which has, from the oldest times, excited the astonishment of travellers by its uncommon fertility and beauty, particularly on the East and South sides of the mountain, where numerous towns and villages and country houses lie embosomed in the midst of a most luxuriant vegetation. There Mascali, celebrated for its wine and almonds, is situated, and many other towns, among which Catania ranks as the most beautiful city in the South of Europe. Many tropical plants here flourish in the gardens as in their native country: the Pisang, *Musa Paradisaica,* ripens its fruit, and the *Erythrina corallodendron, Hibiscus mutabilis, Cassia biflora, Datura arborea,* and *Cæsalpinia Sappan,* are adorned with their large and lovely blossoms. The *Date Palms, Phœnix dactylifera,* give to the scenery an African appearance; while the strange forms of the *Cactusses, C. Opuntia* and *maxima,* which latter attains a height of twelve feet, and the *Agave Americana,* which even in its third or fourth year throws up its colossal flower-stem, remind the traveller of tropical America. At Palermo the mean temperature is 65° of Fahrenheit, or 14° of Reaumur. The greatest degree of heat during twenty

Mo. Bot. Garden,

years was 105° Fahrenheit (31° Reaumur), and the extreme cold, during the same period, 34° Fahrenheit, or + 0 9° Reaumur. The average number of rainy days are sixty-five in the year; the mean quantity of rain, 21,149 English inches.

At Catania, as might be expected from its site on the southern declivity of the mountain, the mean temperature is considerably higher than at Palermo, viz. 68° Fahrenheit, or 16° Reaumur; July is the hottest, and January the coldest month; while the number of wet days amount to sixty-three annually; though last year there was no rain from the beginning of May to the 1st September. The West wind is the driest, and the East wind is always moist, invariably bringing rain in winter.

Very little *corn* is cultivated in the lower region of Etna; the ground being rocky there are but few spots suited to its culture. The common fodder for cattle in Sicily is *barley*, both in the green state and the threshed grain. *Oats* are nearly unknown, so that even horses are fed on barley, as at the time of the Trojan war. *Wheat* is also cultivated, but only as far up the mountain as 1,600; a limit much beneath that which is assigned to it by nature. *Maize* is little grown in Sicily, and scarcely at all on Etna. Every kind of vegetable succeeds in this region, especially *cabbage, lettuce, artichokes, gourd, cucumber, peas, beans*, both the *broad* and *French* kinds, *Phaseolus vulgaris* and *Cajan*, and *lupines*, the seeds of *Lupinus thermis*. The latter are particularly the food of the poor, who frequently eat the green pods of *Vicia Faba* raw, and the ripe beans without any kind of preparation, except roasting them a little in the ashes. The *lupines* are put into salt, or in sea-water, to soak for twenty-four hours, by which means they lose their disagreeable bitterness, and are then eaten without cooking. Among fruit-trees, the *fig, pomegranate, almond*, and *pistachio*, are most cultivated. *Walnut-trees* are rare, but *hazel-nuts* are grown in such quantities as to form a considerable article of export from Sicily, especially to England. Wherever there is water, those lovely fruits of the favoured southern clime, the *orange, lemon*, and *lime*, are produced in great abundance and numberless varieties. Their limit may be taken at 1,900 feet, since at Nicolosi, 2,184 feet, they are sometimes killed by the frost. The *date* is not found higher than Aderno and Trecastagne, 1,680 feet above the level of the sea; and though its fruit is always set in Sicily, it seldom attains perfection, though in good years the seeds are so ripe as to vegetate. There is a beautiful *date palm* in the Botanic Garden at Palermo, raised from seed ripened in Sicily, and sowed fourteen years since; its stem is now 10 feet high. The *fig* bears excellent fruit so high as Nicolosi, 2,200 feet, and perhaps at a still greater elevation; in that place are beautiful trees of *Celtis australis*, called in Sicily *Menicoccu* and of the *Stone Pine* (*Pinus Pinea*), which latter only grows singly and in a cultivated state, in the kingdom of Naples. The *sugar-cane* is not seen in the gardens of Etna, though frequent at Avola, &c.; nor is the *Rhus Coriaria*, of which the culture yearly increases, grown at all at Etna. On the other hand, the *cotton plant, Gossypium herbaceum*, is sown plentifully on the shores of the Simeto, and its produce is of such excellent quality as to rank with that of Louisiana for snowy whiteness: it even succeeds at an altitude of 1,000—1,200 feet above the sea. The great *Italian Reed* (*Arundo Donax*), whose arborescent stem and broad leaves recall to mind the tropical bamboo, is in frequent cultivation for the purpose of making stakes for vineyards, and in various other ways; and together with the *mulberry* (*Morus nigra*), of which the foliage nourishes the silk-worm, to the exclusion of the rarer *M. alba*, is seen at an elevation of 2,500 feet. There, too, the *olive* grows, though the greater part of this region is dedicated to the *vine* (*Vitis vinifera*) which throughout Sicily is trained to stakes of *Arundo Donax*, and not to trees, as in Lombardy and Naples. The limit of the *vine* is 3,300 feet. On the roughest lava thrives the *Indian* or *Prickly Pear* (*Cac-*

tus Opuntia), of which the large cooling fruits are sold at the rate of one Sicilian gran, or less than 2d., for thirty. This plant is one of the most useful presents of the New to the Old World, as it grows on the poorest and most rocky soil, where nothing else will vegetate, requiring no attention, and even its succulent-jointed stems are greedily devoured by goats, while the fruits are highly acceptable to the poor; and strangers, who seldom like the flavour at first, soon learn to value their cooling properties. There are numerous varieties; light and dark red, and green; the latter called *Moscarelli*, possess the finest flavour, as does the aromatic and scarce variety, which has no seeds. Three species of *Opuntia* are raised in Sicily, the *Tuna*, the esculent-fruited one, mentioned above, and *Cactus maximus*, which is only employed for making impenetrable hedges, to which its spines, an inch long, are particularly suitable. The *Cactus Opuntia* is of much service to Etna, by rendering the fields of lava capable of being worked, as the roots penetrate every crevice of the stone, and soon burst the largest blocks asunder by their gradual increase. Under their shade grow many species of plants, as *Lupines*, *Calendula*, *Asphodelus*, *Asparagus albus* and *acutifolius*, several kinds of *Silene*, *Brassica*, *Sinapis* and *Reseda*, besides *Acanthus mollis*, *Arum*, *Arisarum*, &c. all of which would soon be burnt up by the scorching rays of the sun without such a shelter. It is reckoned that, within thirty years of the *Cactus* being planted, cultivation may commence on the lava fields. Besides the plants just enumerated, those which are most abundant in the lava streams are, *Andropogon hirtus* and *distachyos*, *Lagurus ovatus*, *Rumex scutatus*, *Valeriana rubra*, *Plumbago Europæa*, *Thymus Nepeta*, *Satureja Græca*, *Ranunculus bullatus*, *Capparis rupestris* (*peduncularis*, Presl.) *Alyssum maritimum*, *Isatis tinctoria*, *Scrophularia bicolor*, many species of *Toad-flax* (*Linaria*), *Heliotropium Bocconi* with white, large, sweet-scented flowers, *Mandragora autumnalis*, *Prenanthes viminea*, *Apargia fasciculata*, *Senecio chrysanthemifolius*, *Daphne Gnidium*, *Spartium infestum*, *Spartina juncea*, *Physalis somnifera*, *Solanum Sodomæum*, *Ricinus Africanus*, *Smilax aspera*, *Euphorbia Characias*, and *E. dendroides*, the tree-like *Spurge Laurel*, one of the finest shrubs in Sicily, which rises to a height of about six feet, the stem forking soon above the ground, and each branch dividing again, so that the form of the whole is perfectly semiglobular. In summer it is quite bare of foliage, when the numerous, smooth, verticillate branches give the plant a most singular appearance, but with the rains of autumn the numerous linear leaves begin to sprout forth at the end of the boughs, and a corymb of yellow flowers tips the extremity of each branch in the month of February; so that one could scarcely recognize the dry leafless shrub of summer in the verdant and yellow-blossomed bush which strikes every beholder in the early spring. One is reminded of the vicinity to Africa and its islands by this *Euphorbia* and its congeners, *E. Canariensis* and *E. balsamifera*. We saw these last at a height of 1,500 feet above the sea, accompanied by *Smilax aspera*, which on the North coast attains to the greater elevation of 2,500. Etna, however, is deficient in all those tribes which present an analogy to the region of *Laurels* in the Canary Isles, and the true *Victor's Laurel* (*Laurus nobilis*) is not really wild any where in Sicily, though it grows here and there in hedges near the towns; for instance, at Randazzo, 2,000 feet high. *Mandragora autumnalis*, of which the blue flowers cover whole tracts, in autumn, as with a cærulean carpet, we found at 2,500 feet; where we also met with solitary specimens of the *Strawberry*, (*Fragraria Vesca*,) seen no where else in Sicily, though plentiful in the shady woods of Valdemone. Among Ferns we specially observed *Acrostichum velleum*, *Grammitis leptophylla*, *Cheilanthes suaveolens* and *Ophioglossum Lusitanicum*, these at 1,700; *Ceterach officinarum*, *Asplenium Trichomanes* and *Polypodium vulgare*, combined with *Cotyledon Umbilicus*, and several species of

Sedum, cover the stone crevices so high as 3,300 feet, and may, perhaps, be found at a still greater elevation. It is singular, that not a single *Sempervivum* grows in Sicily, while fourteen species are found in the Canary Islands; and though Sicily has ten species of *Sedum*, the Canary Isles have none.

(To be continued.)

EXCURSIONS IN THE NEIGHBOURHOOD OF QUITO, AND TOWARDS THE SUMMIT OF CHIMBORAZO, IN 1831.

By the late Colonel Hall, of Quito.

(*Continued from p. 29.*)

EXCURSION TO COTOPAXI, THE VALLEY OF BAÑOS, AND CHIMBORAZO.

On the 22d of November, M. Boussingault and myself set out on our last and longest excursion. Dr. Dasti accompanied us as far as Cotopaxi. The first day's journey brought us to Callo, distant from Quito about twelve leagues. The road passes, first, the level plain of Turupamba, in the Quichua language, "Plain of Mud;" then the wooded ravines of Tambillo, watered by the streams which descend from Atacago down the head of the valley of Chillo; and leaving the village of Machachi, surrounded by verdant pastures, on the left, and those of Aloa and Aloasi at the foot of *El Corazon* on the right, it crosses the *Paramo* of Tiopullo, already alluded to as dividing the level lands of Quito into two basins. Its bleak situation, rather than its height, which does not reach 12,000 feet, gives it the character of a Paramo. The northern slope is profusely sprinkled with a species of *Gentiana,* and the southern is covered with thickets, among which are found several *Buddleas,* mixed with *Ribes frigidum, Berberis glauca,* and the shrubs which designate the central regions of the mountains. At the foot of the ridge, is the farm of Callo, famous for the ruins of an edifice of the Incas, most probably one of the *Tambos,* or Inns, erected by them for the accommodation of troops and travellers. The estate belonged to the Augustine Friars, from whom it lately passed into the hands of Don Jose Felix Valdivieso, who is erecting a new farm-house with the materials of the ancient edifice, which, in consequence, will soon altogether disappear. He told us that he had taken particular care to preserve it; but we found the *preservation* to apply only to the stones, which were preserved by being transferred from the old building to the new. It has been described both by the Academicians and Humboldt; some account of it, however, may not be considered superfluous, if it be only to save the trouble of reference.

The whole length of the Quadrangle is about 150 feet: the side chambers are about 40 feet by 12, with narrow passages betwixt them. Of these, four, in the year 1826, were entire, except the roofs, the remainder, more or less in ruin; especially those at the two ends, which leaves their figure a matter of conjecture, though it most probably resembled that of the others. The present farm-house occupies the site where the entrance seems to have been, and where there were the remains of a conduit. Along the wall of each room, opposite to the entrance, is a row of niches, alternating with knobs carved in stone, probably for the purpose of suspending arms or utensils. The entrances are 7½ feet high, and 3 feet wide: the height of the walls 92 feet; their thickness 2 feet 4 inches. They are of pumice stone, not placed, as in many edifices of the Incas, in irregular blocks, ingeniously adapted to each other, but perfectly squared, though the pieces are of unequal size, and every where symmetrically arranged, with a slight convexity towards the outside: the cement, if any were used, being scarcely perceptible; and it was probably of a liquid nature, as mentioned by Garcilaso de la Vega. The preservation of this monument of antiquity, which has resisted the earthquakes that shook down the proudest edifices erected by the Spaniards in its neighbourhood, was so much the more in-

teresting, as such remains are extremely scarce in all the district of Quito. The only edifice of importance besides this, is the Fortress or Palace of Cañar, in the Department of Asuay. In the City of Quito, no vestiges remain of the Temple of the Sun, which stood on the *Panecillo*, nor of the House of the Moon, which rose on the opposite eminence of San Juan. The avarice of the conquerors, who left not a stone unturned in their search after hidden treasures, together with the interest of employing the old materials in the structure of their new city, have eradicated every trace of the capital of Atahualpa. The only relics I ever discovered, are two images of the sun and moon, sculptured in alto-relievo on two stones, one of which forms one of the portals of the Convent of St. Catharine, and the other part of the sill of an inner door of the same building. The shape of the stones, the style of sculpture, and the nature of the devices, leave no doubt of their being genuine remains of antiquity. It would be desirable to rescue them from their present neglect, and preserve them in a manner better worthy of their origin.

About a quarter of a mile from Callo, betwixt the ruins and the ridge of Tiopullo, rises a conical mound, 450 feet high, which, partly from tradition and partly from its symmetrical figure, was supposed to be a work of art. M. Boussingault and myself, however, after an accurate examination, dissented from this opinion, chiefly from the appearance of part of the rock *in situ*, and from the circumstance of springs of water issuing from its base. Probably, however, the labour of the Incas may have helped to round it into its present symmetrical figure. The elevation of Callo is 10,092 feet. To the north-east, distant about four miles, rises the Volcano of Cotopaxi. The intermediate plain, for several leagues, is covered with immense masses of rock, projected by its eruptions, like the fragments of a bomb. Some of them are black and calcined; others superficially vitrified. The soil is bare and sandy, though not incapable of cultivation, when irrigated. The landscape is dreary to desolation. Elenisa and Cotopaxi, like giant phantoms, alternately enveloped in storms and darkness, thunder on opposite sides of the horizon. It rarely happens that the traveller crosses the ridge of Tiopullo, without encountering a tempest, brewed by one or other of these formidable neighbours. The rains, however, fall principally on the northern side, towards Machachi and Quito.

On the 23d, we set out for the purpose of attempting the ascent of Cotopaxi. Crossing the plain, already described, we ascended towards the foot of the snow. A few shrubs grow in the hollow near the plain, but the place of the *Pajonales*, or "*Region of Grapes*," is supplied by a dreary extent of bare volcanic sands, of an iron colour, on which exists no trace of vegetation. We found the limit of congelation at 15,646 feet. The truncated cone of Cotopaxi is singularly regular and beautiful; a dark wall of rocks surround the crater, contrasting with the dazzling whiteness of the snows beneath it. Made wise by experience, we had provided ourselves with masks, which protected both the face and eyes. We found the ascent toilsome in the extreme: it cost us above four hour's labour, to gain a point near the foot of the wall, where M. Boussingault's barometer indicated an elevation of 18,366 feet. We were consequently only 500 feet from the summit, supposing this to be 18,860 feet, as calculated by the Academicians. But here our progress was arrested. The snow, that had hitherto been hard and glassy, accumulated round the base of the crater, became so loose that we ran the risk of being buried in it; so that to proceed was impossible. The sulphureous vapours of the crater were strongly perceptible, and we regretted our inability to look into the mighty laboratory of nature now so near us. The fatigue, however, we had undergone in the ascent, perhaps, reconciled us a little to the necessity of returning. Some idea may be formed of its steepness, from a trifling incident. Dr. Dosti and myself, on sitting down to rest

upon the snow, had laid our walking-sticks beside us; but they were scarcely out of our hands, when they descended like arrows over the frozen surface, far beyond any chance of recovering them. The thermometer, at the highest point of our ascent, stood at 34°, about two P. M. Under the snow at 32°. At four P. M., at the foot of the snow, on our return, at 42°.

The volcano of Cotopaxi has not only stamped on the surrounding country the traces of wide-spreading and repeated desolation, but may be said to have decided its political destiny. When Quisquio, the truest and ablest of the generals of Atahualpa, was preparing, in 1533, to dispute the dominion of Quito, with an equality of hopes and advantages against the Spaniards under Benalcara, a tremendous explosion of the mountain was interpreted by his army as a sign of the fallen grandeur and dominion of the Incas. So the earthquake of Caraccas, interpreted by superstition, ruined the cause of independence in Venezuela. Since the period of the conquest, the following eruptions have been recorded. In 1593, when many Indian villages were buried; in 1743, it rained ashes, and poured rivers of mud round Latacunga and the valley of Viciosa. Another explosion took place in 1744. These were witnessed by the Academicians, who measured the column of fire which rose from the crater to the height of of 2,950 feet. In 1768, it threw out such quantities of ashes, that Quito was darkened (April 7th) from eight A. M. to six P. M. In 1808, it threw out ashes and hot water, and the snow was melted from its summit. It does not appear, from a comparison of these dates, that any inference can be drawn as to the increase or diminution of its activity. Previous to the conquest, we have no series of observations; and, in the subsequent period, it is propable only the more formidable explosions have been historically recorded. A small column of smoke is still frequently seen, rising from the eastern extremity of the crater; and though we may consider that all volcanoes have a tendency to wear themselves out, there is no particular reason for supposing Cotopaxi has yet reached the epoch of age and decay.

On the 24th, M. Boussingault and myself, (Dr. Dasti having returned to Quito,) made an excursion to the Pass between Ruminavi and Cotopaxi, called *Lempio pongo;* and thence up the ravines of the volcano, to discover if obsidian formed any part of its products with which the soil is coated. We found, however, not a single specimen.

On the 26th, we continued our excursion to Latacunga. This town is built on a porous volcanic soil, abounding in nitre, which has caused the erection of a powder manufactory. As its extent indicates, it once contained a population of 10,000 inhabitants; but destroyed by repeated earthquakes and eruptions of Cotopaxi, it is now a city of ruins. The traveller looks with wonder on the massive remains of the Jesuits' Church, the walls of which, in spite of their strength and thickness, have been rent into huge fragments, and heaped on the ground, with all their columns, domes, and arches, as if blown up by gunpowder. This sight strongly impressed upon us the prodigious power which must have heaved up and shaken the soil, to which this building, constructed with peculiar solidity, could offer no resistance. All the edifices of Latacunga, even private houses, are built of pumice stone, which when cemented with mortar, hardens into an homogeneous substance, incapable of separation. Instead of tiled roofs, vaulted terraces, and on the churches, domes are formed in the same manner; so that the whole building, great or small, may be considered, when well constructed, as cut out of a single stone, for which reason, the ruins exhibit not so much a separation of parts, as a general destruction, like that of rocks blasted in a stone-quarry. On the side of the town towards the river, a mill is pointed out, built in this manner, which has resisted two earthquakes, and been buried under two volcanic eruptions; but, it is probable, its peculiar site has contributed to its security, standing on a ledge

of rock, formed of indurated volcanic matter, the course of which appears to have terminated at this point, and now forms a bank about forty feet above the bed of the river. It affords a curious instance of that propensity in man to turn his thoughts alike from past and future evils, when we see the inhabitants of Latacunga, on a soil composed of the eruptions of Cotopaxi, which is still smoking before them—amid the spoils of recent earthquakes, and with warning shocks, repeated almost monthly, quietly rebuilding on the same foundations, and raising up their fallen churches, as if they "had taken a bond from fate."

Latacunga has been four times ruined by earthquakes, and twice buried beneath the eruptions of Cotopaxi: viz., in 1698, 1757, 1797, and 1808; and in 1742 and 1768. In 1808 the earthquake seems to have been caused or accompanied by an explosion of the volcano.

There is a spring near the town called in the Quichua language, *Tembopoglio*, "the spring that boils," because it constantly buddles out of the ground: the inhabitants say it ceases previous to an earthquake. Latacunga is rather lower than Quito, being 9,170 feet above the level of the sea, by M. Boussingault's barometrical measurement.

The vicinity of Cotopaxi exposes it to chilling winds, and the general aspect, both of earth and sky, is cold and dreary. It abounds with water, which percolates every where through the whole porous soil, and serves to irrigate numerous plantations of vetches, called *Alfalfares* in the neighbourhood. The streams which descend from the ridge of Tiopulo, form the river which runs near the town, on which are the ruins of a handsome bridge, destroyed by the earthquake of 1797. Its place is supplied by one of timber. The declivity of these waters is towards the South, until, joined by the river of Ambecto, they turn each through the valley of Baños, and find a passage through the mountains to the Maranon.

The day after our arrival a friar of La Merced called on us, to persuade us to examine a mine on his estate, of the value of which he endeavoured to convince us, by an assurance that, some years ago, a great philosopher (un gran sabio) had examined the hill in which it is situated *with his telescope*, and pronounced it extremely rich. We did not consider this telescopic view a sufficient motive to take us a day's journey; yet it was our fortune to be equally misled in another direction by the story of a *burning* lake, called *Quintoa*, distant from Latacunga ten leagues on the declivities of the Western Cordillera. We had a tiresome day's ride across the Paramo, and descending to the bed of the Toache, passed the night in the miserable farm-house of Pilaputzin, where we nestled like pigs among the straw, and the next morning visited the lake, which is embedded in a conical hill, rising above the course of the river. But all the tales of its mephitic vapours and fiery exhalations had vanished as we drew near it, and we returned to Latacunga lamenting the propensity of the inhabitants to telling lies, and our own credulity in believing them.

On the 30th of November we proceeded to Ambato, following the left bank of the river of Latacunga, through the village of San Miguel, and thence crossing to the right. Another road passes the river close to Latacunga, and crosses the small streams of Silanche and Nassichi, where they both unite. The country, though cultivated, has always a dry, barren aspect. *Maize* is chiefly sown, but often fails for want of rain. Nothing but the low price of the labour extorted from the Indians could render the greater part of these lands worth the expense of tillage. The hedges are every where formed of the *Agave*, which flourishes luxuriantly on the dry and sandy soil.

Although the distance to Ambato is only eight leagues, every body complains of its length, wearied by its never-failing dust, heat, and monotony. In a rock, formed by the winding of a rapid river which descends from the snowy mountain of Carguirago, at the feet of the sand-banks, now retired about a mile from its present chan-

nel, stands the town of Ambato. At the point where the road crosses it by a wooden bridge, the inhabitants have been for several years desultorily employed in forming a *Socabon;* but war and bad government are sad deadeners of enterprize, even when the spirit is stronger than in South America.

The elevation of Ambato is 8,540 feet, the mean temperature about 61°, but its sheltered situation protects it from the cold winds of the mountains; while, for the same reason, there is an increase of reflected heat; so that it resembles a natural hot-house, producing not only peaches, Tunas, apples, pears, and other fruit in great abundance, but also in the necks or vegas of the river below the town, sugar-cane, of which there are several plantations. The town was nearly destroyed by the earthquake of 1797, and vestiges of the catastrophe are still evident; but it is in a remarkable degree more cheerful to the eye and feelings than Latacunga, or indeed any town betwixt Quito and Guayaquil. The sky is almost constantly bright, the temperature soft and agreeable; the space betwixt the town and the river is laid out in plantations and gardens, artificially irrigated and shaded with groves of Capulis, willows, peach, and fig, mixed with roses; the fences are covered with the common *Tropæolum;* and I have found growing among the stone-walls *Mesembryanthemum crystallinum;* of its emigration to this country there is no record. A small degree of horticultural science would render the gardens of Ambato highly productive in objects of taste and utility. The fruits, flowers, and vegetables of a variety of temperatures might be combined and naturalized. *Tunas* are cultivated, both for the sake of the fruit, and for the production of the Cochineal, which, though rudely prepared, is of a good colour, and extensively employed in the manufacture of the coarse woollens called *Bayetas.* The dryness of the soil and mildness of the climate might be turned to account in extending this branch of industry with so much the more advantage, as that the lands so employed can scarcely be put to any other purpose.

Ambato is famous for two articles of trade, betwixt which there seems no necessary connexion—*bread* and *boots.* Certainly the bread is unequalled throughout the South; and I have seen boots, of which Mr. Hoby would not feel ashamed.

On the 1st of December we continued our journey, leaving the main road to Guayaquil, which passes the village of Mocha, to Chimborazo and Guaranda, we turned in a south-easterly direction, towards the village of Peliso, on the right bank of the river of Ambato, below its junction with that of Latacunga. The distance is about three leagues. The road lies over a level, cultivated country, crossing the little stream of Pachanlica. Near the village is a quaggy meadow, called *Moya,* forming the relic of the torrent of heated mud and water, which during the earthquake of 1797 was poured out of Carguirazo, and overwhelmed the village with all the surrounding country; in many places the whole surface of the soil was set in motion; farms and houses were transported from their sites, and overwhelmed in the miry deluge, leaving not a wreck to indicate where they had existed. Opposite to Pelilco, on the left bank of the river is the village of Patati, famous for its fertility. The river is crossed by what is called a *Taravita,* a contrivance described by several travellers in South America, and rendered necessary in situations where the breadth and rapidity of the stream render the construction of a bridge too difficult or costly. On the evening of our arrival we visited the curate of the village, to make some inquiry relative to the road to Baños, and also to obtain some precise information as to the locality of a spot, the exhalations from which were said to be fatal to birds and animals that approached it. The venerable pastor wondered we should trouble ourselves about such rubbish (porquerias) rather than look for mines of gold and silver. Age was fast conducting him to the grave, yet he could imagine nothing valuable in the world but money. We obtained, however, some vague information as to the

object of our inquiries, and next morning set out for Baños.

There is a striking change, both in landscape and climate, when, after travelling about two leagues from Pelilco, over a cultivated, monotonous country, one arrives at the ridge which overlooks the valley of Baños, formed by the course of the river Achacubo, which descends from Alausi and the roots of Chimborazo, emerging from a thick copse resplendent with *Fuchsias*, *Lobelias*, and *Andromedas*, and a variety of flowering shrubs, we have Tungaragua, with its truncated cone and crater rising majestically in our front, on the opposite side of the valley, the depth of which is about 1,000 feet below the ridge. The climate is not only more *tropical*, but there is a constant opposition in its seasons with those of the table land above. When the rains set in, in the valley, it is summer in the highlands, and *vice versâ*. The muddy state of the road through the copse, first indicated this change. Descending by the tortuous path, about midway of the ridge, we came to the plantation of Tunguravilla. Here we were to look for the poisonous exhalations. We met with the owner of the farm near his house, but he could tell us nothing about it; and we were on the point of giving up the search, when an Indian, working on the estate, offered to conduct us to it: in fact, it was not an hundred yards from his dwelling. He pointed out to us, a small aperture or cleft in the midst of a thicket, round which lay several dead birds. It was a small fountain of carbonic acid gas, of the same nature as the *Grotto del Cane*, in Italy. The vapour was strong enough to kill small animals, which happened to stray within its influence. We continued our descent, through brakes and briars, to the edge of the river. Its wild and terrible beauty is fresh on my memory, but the painter and poet are alone privileged to pourtray Nature's grander features: less perhaps, by mere accuracy of imitation, than by creating a sense of the sublime or beautiful, analagous to that of the spectator. The river Achambo, descending from the Canton of Alausi, and collecting the waters of Chimborazo, pours a broad and rapid stream, subdivided near Guanando into several branches, till, arriving at the foot of Tungaragua, the whole mass of its waters is compassed into a narrow chasm, the perpendicular sides of which seem hewn by art from the solid rock of trachytes. Indignant at its confinement, it boils, roars, and precipitates itself in foaming eddies, or leaps, in a glittering cascade, contrasting its white spray with the dark walls of its prison-house; till, after a course of above three leagues, it hurls itself despairing down the cliff of Agazan, and obtains its final release in the woods of Canelos. We halted, for some minutes, at the edge of one of the cataracts, watching the rainbows playing on its crest, and its wild plunge into the abyss below. We then crossed the bridge of Cosua, so fragile, trembling, and fearfully suspended over the gulph, that it might remind one of the Mahometan sabre-edged passage over hell into paradise. Nobody crosses mounted, for the slight fabric totters under the tread of a single passenger. The breadth of the river is not, here, more than 45 feet. From the bridge to the torrent, we reckoned might be 100 feet. The barometer gave for its elevation above the sea, 6,906 feet: the thermometer stood at 70°. Continuing about a league along the right bank, we came to the foot of Tungaragua; at this point, the united streams of Latacunga and Ambato join the Achambo. For about a mile, the ground is covered with immense masses of rock, said to have formed the peak of the cone of Tungaragua, which was blown off and the ruins scattered in their present state, during an explosion in 1773, when the village of Baños was destroyed, with the exception of the church, in which the inhabitants found refuge. Beyond this pass, the valley expands, and patches of *sugar-cane* indicate the vicinity of Baños, where we arrived early in the evening. The situation of the village, embosommed in groves of *Plantains*, *Bananas*, *Orange-trees*, and *Guavas*, and surrounded by fields of *su-*

gar-cane, presents an image of tropical fertility and abundance; but the reality is sadly wanting. There is such a scarcity of provisions, that invalids, who resort to the baths, are obliged to furnish themselves with supplies, as if for a sea-voyage.

The common spirits of the country alone are plentiful; and this plenty, by the dissipated habits it engenders, accounts, perhaps, for the scarcity of every thing else.

The inhabitants are few: their houses built with wattles, and thatched with grass. Their chief food is *maize,* and the different species of *Pumpkins* and *Gourds,* which are produced without the toil of cultivation.

The curate, whom we visited on our arrival, complained bitterly of his *banishment;* and we found it necessary to make no longer a stay than might be sufficient to consume a couple of hens, the only provisions which, with great difficulty, we could purchase. Yet, with the advantages of industry, joined to those of nature, Baños would be a retreat alike agreeable to the naturalist, the invalid, and the philosopher. The hot spring issues from a bank of yellow clay, at the foot of a perpendicular cliff, close to the village: its temperature is 130°. It is neither chalybeate nor sulphureous, but appears to contain carbonic acid gas. A cascade falls from the summit of the cliff, contrasting its silver spray with the thick verdure which partly shadows its descent, and the bright green of the *Bananas* which grow at its foot. This streamlet seems to temper the waters of the spring, so that baths may be formed to suit the bather's taste. Nature has done everything—art, nothing; for the only bathing-house is a miserable shed of leaves, into which it is necessary to creep to undress. Close to the village runs a rivulet, called Baltun, the sources of which are impregnated with a purgative salt, probably Sulphate of Soda.

The day after our arrival (Dec. 3rd,) we set out to visit the Falls of Aqajan, about five miles below Baños. The road winds agreeably among copses and plantations, crossing the torrent of Ulva, which rushes down, as wild and furious, in a small way, as the river with which it unites. About two miles further, a sudden descent down a ledge of rocks places the traveller at the foot of the bridge of Aqajan so suddenly, that he starts, involuntarily, to find himself on the brink of an abyss, with its "hell of waters" boiling far below him. The solid crag seems trembling with the uproar, and the bridge, narrow and fragile as that of Casua, leads to a chasm in the precipice on the opposite side, said to have been cut by the Incas, through which there is a flight of steps to the table-land above, and farm of Aqajan. A gate secures the head of the pass, which seems rather befitting the donjon-keep of some feudal fortress, than the approach to a peaceable farm-house.

It is not more than a mile and a half from the farm to the falls, but the path is so intricate, that we contrived to lose both it, and each other. M. Boussingault, however, reached them; as I had visited them before, I was less anxious. Their height, I consider about one hundred and fifty feet; their breadth, perhaps, not more than twenty-five. The dark colour of the rocks, the contracted glen, and absence of vegetation, give them a character of gloomy sublimity, like the outlet of a dungeon, from which the liberated waters burst into the light and sunshine of the forests below.

This remarkable gap in the Cordillera, lies betwixt the summits of Llanganato to the North, and Zungaragua to the South. One should be inclined to attribute to the action of a volcano the formation of this tremendous fissure, so unlike a time-worn channel: the country to the North and South forms two inclined planes, terminating at this outlet, as will be evident from the following heights:

From the North, or Paramo of Tiopulo,—

Callo	10,092 feet.
Latacunga	9,170
San Miguel	8,900
Ambato	8,540
Pelileo	8,412
Bridge of Casua,	6,906
Baños	6,039

Towards the South,—

Puela	8,021
Penipe	8,264
Riobamba	9,189

The northern basin of Quito is disposed in a similar manner, to give exit to the Guaillapamba towards the woods of Esmeraldas. The lowest point is the village of Penicho:—

Quito	9,524 feet.
Pomasqui	8,697
Penicho	6,350
El Quinichi	8,772
Cayambe	9,724

A tradition is attached to the mountain of Llanganati, as having been the spot where the subjects of Atahualpa threw away the treasures they were transporting for his ransom, when they heard of his murder.

Although this mountain is now a pathless desert, it is certain that in the time of the Incas, a high road extended along the ridge of the Cordillera of Quito; traces of which still exist, and the curate of Pillaro has been recently employed in opening a communication towards the head of Llanganati, with the hope of discovering the golden spoil. At any rate, the road may be useful, as affording a readier communication with the rich forests of Canelos, than that which at present follows the outlet of Achacubo.

On the 4th of December, we left Baños to proceed to Riobamba; so instead of passing the bridge of Casua, we continued along the right bank of the river, to the hamlet of Peula. On the road, we gathered a *Lobelia* with whitish flowers I had not seen before; and, among the fragments of Tunguragua, a species of Orchideous plant, remarkable for preferring a dry, exposed situation. We took up our quarters in a cottage at Puela, for the purpose of making an excursion to Tungaragua, and having procured a guide, we set out next morning. We rode about a mile to the commencement of the woods, which cover its base: here it was necessary to alight, and continue the journey on foot. From its retired situation, and the scanty population of the valley, the forests of Tungaragua have not yielded to cultivation. They form a barrier to the ascent, so much the more impenetrable, as that the *Pajonales* above have not been converted into grazing lands; there is, consequently, no road, nor even a path by which to reach the summit. We were obliged to creep and crawl through the dense vegetation, for about five hours, when we came to a termination of our journey by no means anticipated. We had directed our guide to conduct us *to the snow;* now, all our former experience taught us to consider the *snow*, and the summit of the mountain, as synonymous: we were, therefore, not a little surprized when we had extricated ourselves from the central region of forests, our guide announced to us *the snow.* In effect, we found ouselves in a long narrow valley or ravine, called *La quebrada de Granelisagua*, completely filled with it, while the barometer indicated only 11,122 feet of elevation: thermometer, 46°. We continued to asoend, and found the head of the valley to be 13,317 feet high. The snow extending about two miles from the first point to the second, and bridging over a small stream, which ran under it, the temperature of which was 42°, we were forced to consider it an avalanche hurled down at the period of some volcanic commotion; yet its existence for some time in a mean temperature, so much above that of congelation, and surrounded by vegetation, generally unused to such company, must be considered as curious. When we had arrived at the head of the glen, we found it impossible to get out, but by returning by the same path. Perpendicular bales of rock baffled all our attempts to scale them, and M. Boussingault was, on one occasion, in serious difficulties. We were now convinced of the impossibility of reaching the summit, without making preparations for much more than a day's journey, and we accordingly returned to Puela. The forest, through which we passed, was of considerable botanical interest. Towards the upper part we found *Baccharis genis-*

telloides, several elegant *Andromedæ* and *Alstræmeriæ;* and towards the base, a variety of beautiful *Orchideæ*, indicative of a moist and genial climate. Our time was too limited to make so abundant a collection as the situation afforded; but it is frequently the traveller's fate, in these countries, to be hurried over the most interesting spots, and to be tediously delayed, where nothing compensates the delay.

It is a common observation among the inhabitants, that Tungaragua would be higher than Chimborazo, were it placed on an equal elevation; and, this is true, if we look not to the mass of the Cordillera, but to the cone which rising above the surrounding country constitutes each particular mountain. Tungaragua is the only one whose base is in a warm climate, while its peak rises above the level of perpetual congelation.

	Feet.
Its total elevation is, according to the Academicians	16,748
Height above the bridge of Casua,	9,842
Height of Cotopaxi above the plain of Callo	8,768
Height of Chimborazo above the plains of Sariancaxas	8,414

The base of the cone of Tungaragua appears smaller than that of any other mountain of the Quitenian Andes, its figure is consequently sharper, and its sides, at least towards the summit, steeper. The aperture of the crater is distinctly visible from the valley of Baños, and the surrounding country. It is sometimes filled with snow, which at others is melted away, probably by the internal heat. It is said to be approachable by ascending the valley of Puela, and the Paramo of Minza, on its south-eastern slope; but the road was represented as so difficult and tedious, that we could not resolve on the expedition; the less so, as the volcano was at this time inactive, though its resemblance to the chimney of a furnace is so striking, that one can scarcely observe it without expecting signs of the purpose of its erection.

The analogy betwixt volcano and *chimney*, is very apt to strike the most careless observer of a volcanic country; yet we naturally ask the question, why the imprisoned gases, or whatever be the agents of volcanic eruption, should prefer seeking an exit, where the resistance is greatest—rather through the loftiest mountain summits, than through the vallies or places below? Taking this view of the case, the *chimnies* seem rather the product than the *spiracula* of volcanos. How much of the Andes may thus have been upheaved, must be one of the most curious speculations in Geology, upon which it is probable, the interesting speculations of M. Boussingault, directed especially to the nature and history of South American volcanos, may throw some light, at least as much as science can shed on researches almost beyond human means of knowledge.

December 6th. We left Puela, crossing a river of the same name, close to the hamlet, by a bridge of *bejucos*, or rush ropes, suspended from side to side by means of beams driven into the banks. These swing-bridges, invented by the Incas, are in use on such rapid mountain-streams, as by the variations to which they are liable, render bridges of a more solid construction often impassable. They have, however, the defect of serving only for foot-passengers, the consequence of which is, that the saddles and baggage of mounted travellers must be unloaded, and the cattle made to swim the river, which is always a tedious task, and when the floods are high, a dangerous operation; mules and horses being frequently carried off and drowned by the current. On the present occasion, we merely sat by the river side, while the business was managed by our *suite*, and talked of a formation of micaceous schistus, which Humboldt describes at this spot, and which we could not discover; though blocks of it appear at the Falls of Aqajan, and also on the road betwixt Puela and Penipe.

About two miles from Puela, on the opposite side of the river, is the village of Guanando, which produces the greater

part of the Cochineal used in the manufactories of Quito. We arrived early at Penipe, a pleasant village on the right bank, where there is a bridge of *Bejucos* over the Achambo; but it was now repairing, and we proceeded a league further, to the farm and stream of *Aguas blancas*, where we crossed a bridge of the same kind; and, passing through the hamlet of Elen, arrived late in the evening at Riobamba.

The present city of Riobamba was founded after the destruction of the old town, by the earthquake of 1797. It stands in the midst of a sandy plain, almost destitute of vegetation, and has no water but what is conducted, by a canal, from a distance of several leagues, loaded with impurities, and of a villainous flavour. One is astonished how such a site could be chosen for the capital of a considerable district; but the wonder is explained by the Spanish system of government. The then Corregidor, partly from caprice, and partly from interested motives, *compelled* the inhabitants to settle in this desert. In despotic governments, there is no tool so despicable, but has power to rule the fate and *fortune of thousands*.

It is a lucky circumstance, that the *Capuli* flourishes on the poorest soils. Groves of this tree have been planted in different directions, and serve both to protect the town from the winds, and to form a barrier against the moving sands, which would otherwise inundate the streets. Cultivation, also, which follows man under the most disadvantageous circumstances, has so far conquered nature, that fields of maize and vetches have grown up in the vicinity. But the traveller, who in all parts of Colombia traverses so many tracts of rich uninhabited country, wonders how a city should have grown up on plains resembling those of the interior of Africa. The climate participates of the disadvantages of the soil: piercing winds, from the surrounding *Nevados*, alternate with sunshine, rendered more intense from the reflection of the base of dry sand-hills, which compensate, by clouds of dust, their want of vegetation. It must, however, be acknowledged, that no town in the world enjoys a more magnificent mountain prospect than the great square in Riobamba. To the North, rises the dome of Chimborazo, which here presents its most striking features of grandeur; a little further to the North, are the craggy peaks of Carquirago; and fronting Chimborazo, on the opposite Cordillera, rises Capac Urcu, called by the Spaniards "*the Altar*," from its two extensive pinnacles, which may be termed "the horns;" these, if Indian traditions can be relied on, were once connected by a dome, loftier than that of Chimborazo. Nearly to the North, the picturesque summit of Tungaragua rises from the profundity of the valley of Baños, generally half concealed in a veil of clouds, the varying forms of which add to its effect, as its crater now glistens in the sun—now glimmers through their misty shadows.

On the 9th we visited the site of old Riobamba, about two leagues to the South of the present city. The village of Cajapamba and Sicalpi form the extremities of the plain on which it stood. Carved stones, broken pilasters, cornices, and capitals extracted from the ruins, are encrusted in the mud-walls of the Indian cottages, and broken images, the relics of splendid temples, ornament the village-churches. When I visited the ruins, in 1825, considerable masses were still visible, but we now found only a few shapeless heaps of brick-work, and scattered fragments, without a vestige of architectural figures. Less, however, always existed than would have survived a city ruined by ordinary means of decay. A great part of the town was buried beneath a neighbouring hill, the summit of which, sliding from its base, came down in a body on the city. A man was till lately living, who was ploughing on the spot at the time of the catastrophe, and was conveyed, unhurt, with his team, upon the avalanche of earth which entombed hundreds of the inhabitants. Many houses and public edifices were swallowed up, as the land rocked and opened its gulphs, de-

structive as those of the ocean, but more dreadful, because more unnatural. Above twenty thousand individuals are reckoned to have perished in the districts of Latacunga and Riobamba. The focus of the earthquake seems to have been near this vicinity, the Paramos of Tiopulo and Apuay forming the northern and southern limits of its action. The connexion betwixt earthquakes and volcanos does not appear subject to any fixed rule. Earthquakes happen where there are no volcanos, and the volcanic eruptions are not always accompanied by earthquakes; yet, it is said, that during that of 1827, the focus of which seems to have been near Popayan, the volcanos of Pasto, Sotaro, Puraca and Tolima showed simultaneous signs of explosion, and that a column of fire rose from the latter at the moment of the shock. An exact narrative of all the circumstances attending on these throes of nature, in a country so frequently exposed to them, would be highly interesting, but moments of such alarm are not the most favourable for observation, and when the terror has subsided, there frequently enters so much exaggeration of facts, and such a variety in the mode of relating them, that it is not easy to combine the whole into an authentic history; besides, where the sphere of action is so extended, we must depend on a number of reporters, all of whom are not equally capable of faithful description: the personal inspection, by a scientific observer, of all the vestiges of the catastrophe, could alone ensure exactness as to its effects, while its attendant phænomena would be open to much doubt and discussion. Still less have we any means of calculating the probable periods of their repetition. There seems nothing periodical in their ravages, if we may judge from the following list of those of Lima, which have been either the most numerous, or at least the most carefully recorded:—

1.	1568.	
2.	1578.	
3.	1606.	
4.	1630.	
5.	1655.	
6.	1678.	
7.	1687.	Jan.
8.	idem.	March.
9.	1687.	Oct.
10.	1688.	Oct.
11.	1694.	Nov.
12.	1697.	Sept.
13.	1699.	July.
14.	1716.	Feb.
15.	1725.	Jan.
16.	1730.	Dec.
17.	1734.	May.
18.	1746.	Oct.
19.	1806.	Dec.

Many shocks have been felt since 1806; but I have not the dates, nor any statement of the damage caused. In Quito there are commonly two or three felt every year, but with very trifling effect.

We walked from the ruins to the lake of Colta, distant about a mile and a half. It is a quiet sheet of water, about a league in circumference, surrounded by farms and pastures. The water-fowl on its sedgy islets—the cattle grazing on the short verdant turf round its brink—and, a small chapel rising, with its white belfry, on the road side—formed the pleasing fore-ground of a picture, of which the magnificent outline of Chimborazo, stretched on the horizon, constituted the principal feature. We now looked, towards its glorious cupola, much as an engineer surveys a fortress he is about to attack, for we were soon to attempt an escalade.

On the 14th of December, we set out on our final expedition. The road from Riobamba to Chimborazo, and thence to Guayaquil, passes, with a gradual ascent, through the villages of Lican and Calpi: it then enters a narrow valley, formed by the ramifications of the mountains, in which are situated several grazing farms, the last of which is called the farm of Chimborazo, a miserable straw-built shed, consisting of a kind of dog-hole, in which the *major-domo* lives, and a hole of a still inferior description for the Indian servants of the household: here we passed the night. Its elevation is 12,540 feet. The next morning, we set off towards the mountain; the distance is not less than twelve miles of gradual ascent over the Paramas; though judging from the eye, it seems scarcely three—a general effect of the brilliancy of the snow in approximating distances. At about half-past twelve, we arrived at a ravine called Chiliabulla, on the limits of

perpetual snow, and commenced the ascent; but, after about two hours toil, we were obliged to abandon the enterprize, for the snow was so loose that, at every step, we were buried up to the middle. We retreated back to the farm, like a storming party repulsed, but not dismayed, and the next morning we renewed the attack on what seemed a more assailable point.

This was towards the western side, in the direction of what is called *El Arenal*, or the "sand desert," over which passes the high road to Guayaquil. Ascending through a long ravine, the course of which seemed to indicate the easiest mode of access to the upper regions, we arrived at a quarter before eleven A. M. at the foot of the snow. The barometer indicating 17, or 16,000 feet: thermometer, 49°. We found the surface here so hard and glazed, that the hammer was necessary to secure a footing; but, in other respects, the ascent was much easier than that of Cotopaxi.

This was owing to two causes; instead of a steep, uniform cone, we encountered a long gradual ridge, and, in many places, rocks, entirely free from snow. Owing to this circumstance, vegetation had crept up to a height, far above our expectations. At nearly 18,000 feet we found, in the crevices of the rocks, *Draba aretoides;* a species of syngenesious plant, seemingly a *Culcitium*, about three inches high; flower terminal, resembling a miniature *frayljon*, leaves opposite and rather hairy than downy; another syngenesious plant, probably of the same family, and a smaller head of flowers, perhaps a *Draba;* and, finally, still higher, a moss, which may be considered as having attained the highest limit on the globe, at which vegetable life exists. Specimens of all these have been sent to Humboldt and to Dr. Hooker.

At a quarter before one, we had reached the elevation of 18,593 feet: here a perpendicular cliff seemed to threaten a termination to our journey: thermometer 40°. Light drifts of clouds passed rapidly along the mountain; Saussure's Hygrometer indicating 61° 50′. On carefully examining our condition, it was found possible to turn the cliff, and continue our route upwards, though M. Boussingault, in the attempt, lost his footing, and narrowly escaped rolling down the glassy steeps into the ravines below. At two P. M. we encountered a second obstacle of the same nature. The barometer now gave 14,998 f.: thermometer 44°=19,660 feet. The sun had come out, and we suffered more from heat than cold; a feverish sensation and thirst are universally felt at these elevations: both our pulses beat 106 per minute, and we found eating snow a very grateful refreshment. Adopting the measurement of Humboldt, we were now 1,754 feet below the summit, or taking that of the Academicians, only 923. I have no doubt, could we have climbed the precipice before us, we should have had no difficulty in treading the summit of the cupola. Even had we conveniences to pass the night, so as to renew the attempt in the morning, we might have found means to turn the second cliff, as we had done the first: but the difficulty of these expeditions consists, in the impossibility of transporting such articles as are indispensable to pass the night, without the risk of being frozen to death, or buried in a sudden snow-storm.

No Indian can be induced to ascend beyond the limit of congelation; that is, beyond the point from which they are accustomed to fetch snow. They have a superstitious dread of the mountains, and are timid in the extreme in every case of novelty. It was a consolation that the point which marked the limit of our ascent, was characterized by features of no common interest. From the perpendicular cliff already mentioned, the elevation of which we reckoned at about 60 feet, descended two cascades, which had been stiffened into ice; one might have supposed they rather owed their origin to a species of stalactitic formation, as the water trickled from above, but this figure representing the straight lines of a falling body of water, with the foam and bubbles at its foot congealed on the frozen snow beneath, compelled us to

assent to what we could not explain, namely, the sudden metamorphosis of a cascade into an ice-column. On the opposite side of the ravine, the snow had fancifully arranged itself into tent-like draperies, the festoons of which had a tint of blue; the colour of the rocks is also singularly varied, passing from a light umber through various tints of brown and red, to grey, purple, and yellow combinations, which, during sunshine, give a brilliancy to the scene, little to have been anticipated at an elevation where the forms and combinations of nature are generally few and monotonous. In the variety of the colours we cannot but acknowledge the action of fire on the trachytes which constitutes the mass of the mountain.

Although the common belief of the country is, that it has never burnt, we found abundant specimens of calcination, to show that anciently its flanks have been rent by volcanos.

On our descent in the afternoon, we were saluted by a violent hail-storm, and observed another danger to which the visitors of Chimborazo are exposed, arising from the action of the wind, which repeatedly separated from the cliffs lamellar fragments of rock, and whirled them through the air almost with the force and rapidity of cannon balls. The frequency of hail-storms, accompanied by thunder, at these elevations, may be considered a strong argument in favour of the agency of electricity in the formation of hail-stones. It is impossible here that rain should have passed from a warmer into a colder stratum of air, since the atmosphere, undisturbed by currents which fluctuate in the lower regions, grows constantly and uniformly colder in proportion to the elevation. The clouds, moreover, are formed so very close to the mountain summits, that we can conceive neither space nor time sufficient for congelation to take place by a mere change of temperature.

The next day, on our return to Riobamba, we examined the extinguished volcano called *Yani Urcu* (black hill), near the village of Calpe; it is a conical hill, or rather mound, covered with black scoriæ, but without any trace of a crater. Close to the spot is an aperture in a ledge of rocks, from which issues the sound of water or air, rushing below, probably caused by a stream which has worked a subterranean passage through the light porous soil from the mountains above, and finds a vent in the ravines below. Springs of a similar nature are numerous in the vicinity of Riobamba, especially in the hamlet of Elen, and they seem common to all the volcanic soils of the country.

We returned to Riobamba, not dissatisfied with the result of our expedition, though we had failed to accomplish the great object of our ambition—to tread the virgin snows on the summit of Chimborazo. It is a curious propensity in man to feel a pride in doing what has never been done before, even though the result should scarcely compensate the labour: however, when *Nature* is in any way the object of our researches, they are very rarely productive of regret or disappointment to ourselves, however unimportant they may appear, and perhaps really are, to others. The plants discovered at a height supposed far above the limits of vegetation, the specimens of minerals collected by none but ourselves, the frozen falls we alone have admired, the rarefied atmosphere we have breathed, at the elevation of 19,660 feet, will ever be pleasurable remembrances, more than sufficient to compensate the time and trouble expended, though they add no important fact to science; nor can be said to influence the general interests of humanity.

On the 23d of December, M. Boussingault left Riobamba for Guayaquil, where he intended to embark, and crossing the isthmus of Panama, to return to Europe. Such a *compagnon de voyage* seldom lights on the Cordillera of the Andes; nor should I be satisfied to think he did not share in the friendly regret with which I bade him adieu. It may be interesting to state, more especially for those who consider scientific pursuits, and those who follow them, as not the most practically useful of their

fellow-creatures, that M. Boussingault, during a residence of some years in Colombia, had investigated, and finally traced, the origin of that afflicting disease so universal in many parts of Grenada, called the "Goitre," or Bronchocele, and by the inhabitants *Coto*. In a memoir published at Bogata, he has produced demonstrative evidence that none of the causes hitherto assigned are satisfactory, or applicable to all the circumstances of climate under which this disease is developed, while that which he assigns, answers to the full, in every case of its occurrence. It is *a deficiency of atmospheric air in the waters*, whether arising from the elevation of their sources, or from the mixture of noxious ingredients. I shall not enter into the proofs and details of this discovery, because it may, ere this, have been published, and have attracted the attention which its importance merits in Europe. To chemical science we are indebted both to a knowledge of the cause, and therefore, in a certain degree, for the means of preventing the malady, and for a remedy which bids fair to prove a specific. The use of Iodine has been found universally successful, and M. Boussingault has discovered that various salts, which experience has shown to act in checking or eradicating the disease, owe this property to the minute portion of Iodine they all contain. Such are those of Guaca, Matasano, El Retiro, and Rio Grande near Medellin; those of Peñol, Mapuro, Mogan, and others near the Vega de Lupia; those of Galindo, Paila, Murculago, and Arninga, in the Upper Cauca.

NARRATIVE OF A JOURNEY TO PAYTA, ON THE COAST OF PERU.

By the late Col. Hall, of Quito.

Travellers who favour the public with the history of their rambles, generally commence by giving some account of the cause, whether business, pleasure, or science, which puts them in motion. To comply with this rule, I must enter into a narrative which, in many respects, may be considered uninteresting; but perhaps may be excused, as throwing some light on the civil and political state of a country which, in this respect at least, is very imperfectly known in Europe; nor do I think what I am about to relate will tempt many of my countrymen to a nearer acquaintance with it. A slight historical sketch will be necessary to make the sequel intelligible. When the Republic of Colombia separated into three independent States, known by the names of Venezuela, New Grenada, and the Equator, there was a general wish among the inhabitants of the latter, to place at their head the late General Sucre, the hero of Ayacucho. It is known to the world how he was barbarously murdered in the wood of Bemecos, on his return from Bogata, to his home and family, in Quito. Who were his assassins still belongs to conjecture; or rather, we may say, is not yet a matter of legal certainty. Moral and circumstantial evidence are not wanting, nor will the crime always remain in darkness. Of one thing, at least, there is no doubt, for whom his death paved the way to the Presidency of the Equator. General Flores had been long in possession of the military command, and, now the obstacle of his rival's superior influence and character was cleared away, found no difficulty in securing the supreme authority, which was confirmed in his hands by the death of General Bolivar, in whose favour he at least pretended to have effected the separation of the Equator; but like General Urdamta, in Bogata, he found it more convenient, when he perceived Bolivar had "fallen into the sere and yellow leaf," to retain for himself what he had affected to hold in pledge for his former chief and benefactor. As far as deceit constitutes a politician, Flores, at this period, proved himself an adept. He deceived Bolivar, who looked upon him as his trustiest adherent; he deceived the people, who were sincere in their wishes for an independent political system; he deceived the friends of liberty by the pretext of a free constitution; and the friends of Bolivar's authority by pretending to act with his connivance.

He cajoled all parties, and all individuals, and finally established himself as a military potentate, with all the trappings and externals of republicanism. His vanity, however, led him still further; he made Bolivar the model of his career, and fancied himself the heir of all his great qualities, because he too undeniably imitated all his defects. To enlarge his dominion towards the North, he filched from the state of New Grenada the frontier provinces of Pasto and Barbacoas. This affront, dissembled for a while in consequence of the disturbances excited by the faction of Urdamta, called for reparation as soon as a regular government was established. The Bishop of Santa Martha and M. Restrepo were sent, in the summer of 1832, to negotiate with a view to the restoration of the disputed territory; Flores relied on several battalions of veteran troops to preserve by force what had been gained by intrigue and treachery; but unfortunately for his views, his avarice was even stronger than his ambition: while he plundered and gave up to plunder the exhausted resources of the country, he suffered his troops to be driven by want and hunger into mutiny. In October 1831, the Battalion Vargas, commanded by General Whittle, an Englishman, rose in Quito, confined their officers, and marched towards the coast, with a view of escaping into the territory of New Grenada. This revolt was attended by several peculiar circumstances; the soldiers, to say nothing of previous and repeated sufferings of the same kind, had been six days without food, save what they could procure by begging, in the midst of a populous and abundant city, and under the eye of Flores himself, who was lavishing thousands of dollars in the decoration of a kind of baby-house he had recently purchased, without the slightest regard for the sufferings of the men on whom he relied for the execution of his ambitious projects. Such was the admirable discipline of this corps, that although complete masters of the city, they offended neither persons nor property; they spared even Flores; who, after they had suffered him to escape, hid himself in a convent till they had departed. On account of their arrears of pay, they demanded and received two thousand dollars, a sum which the day before would have prevented the evil. Early in the same day of the insurrection, they evacuated the city, and commenced their march towards Pasto. A tragical event followed—General Whittle, their brave and worthy commander, stung by their defection, rashly followed them with a few officers, hoping his presence might be sufficiently influential to bring them back to their allegiance. It is not improbable he might have succeeded if he had reached the main body, but the next morning after their retreat, he fell into the hands of their rear-guard, and as the ringleaders were determined to break off all chance of a reconciliation in which themselves would have been the victims, they shot him on the bridge of Guaillapamba, and threw his body into the river—a striking instance among a thousand similar, that he who honourably serves a government without honour, sooner or later becomes its victim. After this cruelty, which was unknown to the main body, they continued their march through the province of Los Pastos, observing the most exact order and discipline; a body of cavalry, sent to pursue them, was constantly repulsed; but served to contrast, by their robberies and disorders, the pacific demeanour of the rebels, as if, to belong or not to the government of Flores, was sufficient, under any circumstances, to stamp the moral conduct of the parties concerned either with infamy or comparative innocence. From Los Pastos the insurgents took the road to Barbacoas; here the town had been abandoned, and the canoes removed from the river, by which means they were deprived both of the means of subsistence and of continuing their march through a country where the rivers were the only roads. They were consequently obliged to capitulate to the government, on condition their lives should be spared. This condition was violated by Flores' officers, who arrived when they found the danger over. Deprived of their arms, they were shot by scores on different

parts of the road; the last butchery of above thirty took place in Quito, for the immediate gratification of the President. A few escaped, or were spared, probably a hundred and fifty out of four hundred and fifty, their original number. It may be supposed the troops who remained were not much conciliated by this plan of treatment. While the plenipotentiaries of New Grenada were still negotiating in Quito, in August 1832, the battalion of Flores, stationed in the town of Latacunga, rose, murdered nearly all their officers, among whom was another Englishman, Lieutenant Colonel Masterson, plundered the town, and marched towards the province of Guayaquil. It might have been supposed that with such terrible examples before its eyes, the government would at least have suspended its system of plunder, and have maintained its few remaining troops, on which it relied to carry on a war so rashly commenced. The negotiations were broken off, the Bishop and Mr. Restrepo had scarcely left the country, when part of the troops stationed on the frontier line of the Juanamba, passed over to General Ovando, who immediately occupied the whole of the disputed territory without firing a shot, and dictated a peace which the Equatorian government was too happy to receive as the price of its existence. It was in the interval between the insurrection of the battalion Flores and the entrance of Ovando into Pasto, that I became implicated in the affairs of the government. On the evening of the 15th of September, an officer, with a detachment of soldiers, presented himself at my residence, in the suburbs of the city, with an order from the government that I should set off the next morning for Guayaquil. The troops took possession of my house, sentinels were placed in every room and passage, and to make security doubly secure, a serjeant with a knife and pistol followed every step I took, whether from room to room, or from one part of the room to another. As no reason was assigned for this extraordinary proceeding, I requested an interview next morning with the Vice President, Don Modesto Larea, who was acting on behalf of General Flores, then in Guayaquil. He received me with great courtesy, professed the utmost regret at the execution of his own orders, and told me the General knew of nothing against me, but that my person had been claimed by the Prefect of Guayaquil, as he had heard (for he knew nothing about it), on suspicion of my being connected with a conspiracy which had been discovered there. It was easy to show that, nothing could be more illegal, or even ridiculous, than for a provincial magistrate to demand an individual should be sent to him a prisoner, without showing the least ground for such a proceeding, or proof of criminality. He readily agreed with me, and proposed as a sort of compromise, I should retire for a few days to any town I should prefer, giving me his word of honour I should there remain unmolested. We shall afterwards see how much worth is the word of honour of Don Modesto Larea, Vice President of the Equator. I offered to go to Ambato, till he should write to me. In the mean while my imprisonment was relaxed, or continued for form sake, and on the 18th I set out, accompanied by an officer, for my place of banishment. Flores, in the mean while, arrived from Guayaquil, and from Latacunga I directed my first expostulation on the arbitrary and illegal treatment I had experienced; and from Ambato I directed a second, through the Minister of the Interior, Don Jose Valdivieso: instead, however, of an answer to my complaints, an order arrived that I should continue my march to Guayaquil. I happened to have been taken ill on my arrival at Ambato, and the officer who had been appointed to conduct me, represented officially to the Government my inability to proceed in my then state of health. Flores had then again left Quito for the frontiers of Pasto, and my friend Don Modesto Larea replied through my friend Don Jose Valdivieso, that I should proceed at any rate. It must be observed, as a supplement to this act of treachery, that ten days after this order was issued, Valdivieso gave a counter-order, in consequence of

the numerous solicitations of my friends in Quito, permitting me to remain, being well aware I was already in or beyond Guayaquil. Fortunately my health mended by travelling. On our arrival at Las Bodigas, where travellers embark on the river to proceed to Guayaquil, an order was waiting that my arrival should be announced to General Cordero, the agent of Flores, in Guayaquil, of whom it is no scandal to say, he is one of the greatest scoundrels in Colombia. The canoe was ordered to wait at some distance from the town, and a guard was sent to conduct me on board a vessel lying in the harbour. The same afternoon (Oct. 6th), a police magistrate came to take my declaration as to the authenticity of a private letter I had written to an intimate friend in Barbacoas, an English officer, giving him an account of an insurrection of the Battalion Flores, and other news of the day. This letter had been seized in the post-office of Quito, in the teeth of the law, and served, for want of better materials, to make out a crime: but as there would have been many inconveniences in playing this trick in Quito, it was sent to Guayaquil, and furnished the pretext for calling me thither, Flores well knowing that his friend Cordero would have no scruples as to legality or justice. Of course I had no difficulty in owning my own letter, and in less than half an hour a boat came alongside with a guard, and the next morning I was at the Island of La Puna, on my way to the Peruvian frontier. From La Puna I addressed a representation to the Prefect of Guayaquil and Governor of Quito, through the British Consul, Mr. Cope, whom I had not been able to see during my short stay before at Guayaquil, by whom they were forwarded with the necessary applications for redress of the injury thus inflicted on a British subject,[1] whose person and property were guaranteed by existing treaties. To none of these representations, whether made by myself directly, or through Mr. Cope, was any answer ever returned. It must be confessed, the little interest shown by the British Government in protecting its subjects resident in these countries, has emboldened men whose actions acknowledge no bridle but fear, to oppress them with, or without pretext, in the confidence it may be done with impunity. It may be suspected I profit by the advantage of telling my own story, to conceal such parts of it as might render the conduct of Flores, if not more excusable, at least more intelligible. I will therefore go a little further into detail, to give "the tyrant's plea, NECESSITY," as set up by himself, its full weight. It may be supposed his government was far from being popular; it was, in fact, the object of universal detestation, save by the few who profitted by the robberies it countenanced. He was, in consequence, continually haunted by the idea of conspiracies, and as the freedom of the press had been totally extinguished, public opinion found no vent, save in the privacy of domestic circles, where it assumed an air of mystery, and became an object of suspicion. Spies and informers are the natural appendages of tyranny. One of these, too worthless to be named, revealed the pretended plot, implicating in Guayaquil, a most respectable merchant, Mr. Pflucker, who conducted the establishment of Gibbs, Crawley, and Co., General Illingret, in attacking whom we might say with Tacitus, *Virtutem ipsam aggreditur*, and in Quito, General Bamgà, the bosom-friend of the informer, who, I believe, did me the honour to include my name in the list. There was no attempt at proof or judicial proceeding, but Mr. Pflucker and General Illingret were suddenly sent to Peru in the same manner that I was transported from Peru, the latter narrowly escaped being *shot* by the detachment sent to seize him in the Island of Puna, where he was residing with his lady and family. Had such an accident occurred, it would have been set down to a *mistake of the officers*. With regard to my share in this Titus Oatts' plot, I must observe that the first rumour I heard of it

[1] Although I formerly held the rank of Colonel in the Colombian service, it is some time since I renounced both the honour and profit derivable from such a title.

was communicated to me by the Vice President, the morning after I was seized; but it is fair to state, Flores and his government had assumed my enmity to them as an axiom, from which they deduced, or interpreted every circumstance of my conduct. In fact, this was owing to my being an Englishman, all of whom Flores considered, and with some reason, his enemies, for we may trust there are stamped in the English character such indelible notions of right and justice in matters of government, that actively or passively they must be considered as the standing foes of oppression. I had, besides, many friends among the *young* men of the country, whose society I cultivated in preference to that of their papas, for the sufficient reason, that they were much superior to them in manners, morals, or, to say all in a word, in education. It was the opinion of the illustrious Bentham, that great social or political improvements could, even in Europe, be expected only from those, in whose breasts selfish and worldly calculations had not extinguished the generous enthusiasm with which most of us start in the race of life. This is true in an infinitely greater degree in South America, where the Spanish system of politics and instruction had implanted little but imbecility and corruption. It is a very hopeless task to make an enlightened patriot of an old selfish bigot. The young Venezuelans saved their country from despotism; the Collegians destroyed absolute power in Bogata, and *died* for liberty in the battle of *El Santerano*. The Equator is that part of Colombia in which the elements of freedom are fewest and most difficult to be combined; yet the rising generation has not entirely remained uninfluenced by the spirit of the age which dawned on its birth. One of my *young* friends, D. Jose Murgeytio, when the Congress met in Quito, presented an energetic remonstrance to that body, demanding a trial of Flores, for his arbitrary conduct; but the Congress was composed of old corrupted relics of former times; their fears would not allow them to *hear* it, and without hearing it they were on the point of punishing the author for the audacity of its *supposed* contents. The tendency of youth is, however, still upwards; and in any country, where the career of improvement has once begun, we have no reason to doubt, in spite of occasional checks and delays, its final progress. In fine, the reasoning of Flores with respect to my conduct and opinions may be thus summed up. As an Englishman I was his enemy, for all the English were so. I had many friends among the young Quitenians, and they were all his enemies, consequently I must be so too. I had already been imprisoned for defending the rights of the people, as guaranteed by the Constitution; I must be, therefore, a seditious character, and the enemy of all order.[1] The intercepted letter, too, though it contained no treason, sufficiently evinced my contempt for his character and administration. All this, it must be owned, was more than reason enough for a despot.—I now continue my journey. In La Puna I met the lady of General Illingret, with her family; she is a native of Guayaquil, one of those females whose character and energies are developed in times of trouble and revolution, though in "the piping time of peace" might pass unnoticed, but for their loveliness; but tried by affliction, rise with a power like that of angels, of mingled strength and beauty. Ever since her marriage, she has seen her husband the victim of intrigue, calumny, and persecution. Three times banished, his honour aspersed, his life repeatedly plotted against, with no crime but that which tyrants deem the greatest—a life without reproach: these repeated sufferings had ruined his health, and had set on her fine features the seal of settled melancholy; but her spirit had fashioned itself to the times, and remained unbowed. It was a temple where the lighter architectural graces had been corroded, while its nobler form and proportions rose more conspicuous from the decay.

[1] There is something ludicrous, and illustrative of the government of the Equator in the circumstance of my imprisonment, which induces me, in few words, to tell the story. Soon after my return to Quito, after my excursion to Chimborazo, the government pro-

About four A. M. (Oct. 7th) we embarked, that is, I and my police guard, to drop down with the tide towards Zarumilla, the Peruvian frontier towards the left bank of the River Guayaquil at this point, which is about two leagues to the North of Tumbez. The channel is above a league wide, betwixt the Island of Puna and the opposite or Eastern bank; and the swell, with a contrary wind, rendered the passage as disagreeable as might be expected from a short sea, and a flat boat of the kind used in this river, called *bongos*, which are canoes raised upon, and carrying a single square sail, commonly very ragged and very badly managed. On the morning of the 8th, we reached the point called Temblique, where we waited for the next tide, lighted a fire on the beach, and made a breakfast of a kind of mussel, found in great quantities embedded in the sand. We here quitted the main river to enter the labyrinth of creeks, which form a kind of net-work along the left bank of the river, for the distance of about thirty miles; they are fringed with thick forests of mangroves, and so intricate, that it is necessary to be well practised to hit the direction to any given point; however, we made but one blunder, and about midnight reached what is called " the Port of Zarumilla," meaning a single shed, at the water's edge, without inhabitants, and so infested with mosquitos, that we determined rather to walk at that hour to Zarumilla, than sustain their attacks. The road was over an open level plain, and in about an hour we reached the farm-house, which, in fact, with about a dozen houses scattered in the neighbourhood, inhabited almost entirely by the servants of the estate, constitutes the hamlet of Zarumilla.

The next morning, my conductor having carried into effect his commission of seeing me out of the line of the Equator, took his leave to return to Guayaquil. He had turned out to be an old acquaintance of mine in Rio Hacha, and so far from giving me any annoyance, had made my journey thus far as agreeable as circumstances would permit. General Cordero had given him a paper for me to sign, by which I was made to acknowledge the right of government to try me *as a traitor*, should I return. Of course I did nothing so ridiculous, but handed the officer a receipt of my having been illegally and arbitrarily expelled by the military authority of Cordero.

I had now " the world before me, where to choose," though rather ill-provided for the journey, for trusting foolishly to the word of Modesto Larea; all my baggage lay in a valise, which was all I required in Ambato, but was far too scanty for so indefinite a pilgrimage as I had now in prospect. The country round Zarumilla is a level plain, interspersed with copses, and covered with long grass, at this season perfectly dry, so that I was rather surprized to see the cattle preserve their condition, and the cows of the farmers yield a tolerable quantity of milk. The cheese of this estate has considerable reputation in Guayaquil. These cattle-farms, which border on the coast, are even more extensive than those of the Paramas, yet they only present a miniature of those of the plains of Orinoco and Apure. Zarumilla is the extreme point where we find that peculiar style of building borrowed from the Indians, which extends from Panama along the whole coast.

jected setting up a mint, literally for the purpose of coining *bad money*, and instead of purchasing the necessary implements, they considered it simpler to *steal* them. A poor blacksmith happened to have a pair of bellows, which the director of the works considered would be very convenient for the new establishment, and as the owner had objected to *lend* them, (for he knew the ominous meaning of the word,) the Prefect, Jose Doroteo Armero, sent a guard to seize them. The man, aware of what was to happen, entreated me to take charge of his shop, and when the escort arrived, I presented myself to defend the property, in virtue of the article of the Constitution, which declares, " No man shall, on any pretext, be deprived of his property, without his previous consent, and due compensation made." In consequence of my resistance I was cited before the Prefect, and as the ministers of a Sultan are all Sultans in their spheres, he was grievously offended at my unceremonious comments on his conduct, and committed me to the public jail for three days. I had, however, the consolation of *saving the bellows*, and enjoying the approbation of all classes of individuals, who hastened to visit me in my confinement.

The houses are raised on posts, about 10 feet from the ground, and are entered by a ladder. They are formed of split cane, thatched with palm-leaves, and bound together by *bejucos*, or stems of a particular climbing plant. Not a nail is employed in the building, and a hatchet is all that is necessary for its construction. They are not much unlike large osier bird-cages, but have the advantages, in a hot climate, of securing a free circulation of air, and are, in general, neater and cleaner than the houses built on the ground, because all kinds of dirt and rubbish fall readily through the floors, which are made of canes split open; they are consequently very elastic and not very convenient for the operation of writing, which, however, is one the least practised in them. The vegetation here consists chiefly of *Mimosas*, *Cactus hexangularis*, which rises to the height of twenty feet, with thorns six inches in length, a species of erect *Convolvulus*, and patches of *Passiflora fœtida;* but my attention was chiefly attracted by a large shrub, seemingly *Octandria Monogynia*, remarkable for the size and beauty of its *bracteæ*, which, from their colour and abundance, gave it a very magnificent appearance. I have not met with it in any other part of the country. At this point commences that striking difference observable betwixt the Colombian and Peruvian coasts. From lat. 9° N. to 3° S. we find either a regular rainy season, as in Panama and Guayaquil, lasting about six months, or such a predominancy of wet weather, as along the coasts of Choco and Barbacoas, that a summer of two months is looked upon as a phenomenon.

Commencing from the neighbourhood of Tumbez, rain becomes scarcer and more uncertain, till it almost entirely disappears in the deserts which extend from Payta to Lima. The mouth of the river of Guayaquil divides two countries, as opposite in features as *Arabia Petræa* and blooming Italy: the cause of this striking difference, observable equally on a lesser scale on several parts of the Atlantic coast, must be sought in the direction of the chains of the Andes; wherever the mountains recede to a distance exceeding one degree from the coast, the part of the country beyond this limit is exposed to almost continued drought. This is the case with the provinces of Coco, and the city of Maracaybo on the Atlantic coast. The western side of the province of Manabi, near Guayaquil, is for the same reason peculiarly dry; and the whole Peruvian coast-line falls within the same rule. At Zarumilla and Tumbez, there is a fluctuation in the seasons: the distance from the mountains being about forty miles, and it increases by the projection of the coast; towards the West the weather becomes more constantly dry through the whole year.

On the 11th of October, I hired horses, and proceeded to Tumbez, distant scarcely two leagues, over a level plain, interspersed with copse-wood. On my arrival at the village, I proceeded to the house of the Alcadi, D. Antonio Abad Puel, to whom I related the why and wherefore of my coming. It was no novelty to him; for some days before, General Illingret and Mr. Pflucker, and a young American, named Taylor, who had been suddenly seized, and banished on *suspicion* of being *suspicious*, had passed through the place on their way to Payta. The name of Flores was execrated by the Peruvians as the author of the last useless and disastrous war betwixt them and Colombia, I was accordingly very kindly received by Mr. Puel, who provided me a lodging, and invited me to his table. The village is built without method or order, on the banks of the river.

The houses are in the Spanish style, that is, built on the ground, instead of being raised on poles; they make, however, a poor appearance, the walls being constructed of wattles, sometimes plastered with mud, and sometimes bare. The roofs are thatched with rushes. The surrounding country is dry and bare; but the banks of the river, which is navigable for boats and even small schooners, are covered with plantations chiefly of *Maize*, *Plantains*, *Guavas*, and the *Convolvulus Batatas*. The tuberous roots of the latter form the chief, or indeed the only article of exportation. They are called *Cametes* by the inhabit-

ants, and constitute an article of trade to Guayaquil, as well as supplying the whale ships which frequent the mouth of the river, for fresh water and provisions. From the village to the coast is a distance of about five miles, and about eight by the windings of the river, the mouth of which is rendered difficult and dangerous to enter by a sand-bar which stretches across it. Such, however, is the dexterity of the whale-boats, that few accidents occur, and inconvenient as it is, it constitutes the only watering-place for ships betwixt Callo and Atacames, on the coast of Esmeraldos. Several whalers arrived during my stay, the captains of which came up to make their purchases and barters: I was amused to see the court paid them by the inhabitants, in whose eyes the captain of a whale-ship is a most important personage. He is in fact to them as important as he seems, for he represents nearly the whole export trade of *Cametes*, on which depends their commercial prosperity; several of them have picked up a smattering of English, the better to establish their commercial connexions, an advantage productive of so much jealousy, that while I was there, there was a project on foot to beg the Alcaldi's interference against it; but Mr. Puel very rationally told the malcontents, that every body might have the same advantage, who would take the trouble to learn English. The inhabitants of the Canton of Tumbez amount to about two thousand; they are almost all *Sambos*, a mixture of African and Indian blood, and are, I know not exactly why, like almost all the inhabitants of the Peruvian coast, the ugliest race I have any where seen. The unhealthiness of the climate is probably a principal cause of the deformity of their features, as well as of their strange mixture of colours. The river of Tumbez, which descends from the mountains of Loxa, rises every year above fourteen or fifteen feet, inundating the village and the whole adjacent country. As rains are very uncertain, the cultivator depends wholly on this inundation for his crops, but when it ceases, it is succeeded by fevers of so malignant a nature, that a third of the population is frequently exterminated. Young children, especially, are cut off, and I was assured, the average of human life did not exceed fourteen years.

The clouds of mosquitos which appear at the same time, no doubt give rise to cutaneous irritations, which produce some of the deformities I have mentioned. To the effects of climate we must add the abuse of dram-drinking, and, among the lower classes, poor diet, composed chiefly of *Cametes*, Guavas, Water Melons, and the fruits of various *Cucurbitaceæ*, yielding a watery unsubstantial aliment. Those who have little faith in physic and physicians, may think the want of both no additional calamity, but we must consider their place is always supplied by old women and quacks, who administer remedies applied at hazard and recommended by prejudice. A few well-known Galenicals and an honest practitioner would certainly give a better chance to the patient.

I have entered into these details, because the same causes operate very extensively on the population of South America, and account for its feeble progress and frequently stationary, or retrograde, condition.

The vegetation round Tumbez might be called luxuriant, even in the dry season, near the banks of the river; but as it recedes from them, it becomes scanty, and on the stony ridges is reduced to a few *Mimosæ*, some plants of *Melocactus, Cactus heptangularis, (hexangularis)*, both of which rise to the height of fourteen or fifteen feet, and a species of *Capparis*, called *Sapote de perro* (Dog's Sapote), because dogs are said to eat the fruit.

On the alluvial soil we find stately groves of the *Mimosa*, called *Algaroba (Mimosa Catechu?)* the seeds of which are eaten by the cattle, and an elegant tree resembling, in growth and disposition of its pendant foliage, the weeping willow, but richly decorated with yellow flowers. I found it forming groves on the river banks, on spots flooded by the inundations, and I subsequently observed a few stunted specimens in the ravines near Payta. *Salsola*, in considerable abundance, grows towards the coast; but the flora of Tumbez was at this

season by no means conspicuous for its beauty or variety. Its most striking feature was a Cucurbitaceous climber, which enveloped in its foliage almost all the vegetation near the river. It is probable the families of plants are not numerous which are fitted by their constitution to sustain the extremes of drought and moisture. The pleasantest day I spent in Tumbez was that of an excursion in company with Don Jose Antonio Carvallo, an exile like myself, to visit the remains of the Inca's temple.

The river empties itself into the sea by two branches, separated by a level alluvion of about two miles; the ruins are situated near the southern branch, upon a tongue of land rising nearly perpendicular above the plain, forming part of the low ridge which appears to separate the alluvial soil from the more ancient formation of clay-slate.

The edifice, of which the foundations only are now to be traced, was so well adapted to the scite, that the hill seems the artificial basis of the building which occupied and covered it in every direction. The situation is commanding; though, as the elevation does not exceed sixty feet, the surrounding country is a perfectly level plain, as far as the ocean, from which the temple must have been distinctly visible in all its golden splendour. The rampart, which nearly surrounded it, is still designated by a bank of earth, and raised roads extend in every direction towards the surrounding plain. No doubt a more accurate examination would throw light upon the style and purposes of the structure; but any labour hitherto bestowed has been directed to the sole object of discovering buried treasures. An antiquarian survey of the whole neighbourhood would be interesting. At the foot of the heights, near the present village, the remains of a canal are distinctly visible, which conducted a stream from the distance of thirteen leagues to irrigate what is now a barren desert. I observed similar traces near the heights adjoining the ruins, and the remains of the conduit prove the interior of the building to have been supplied with water. Similar works of the Incas are traced in all the Peruvian deserts, which then nourished a numerous population. Tradition assigns to the district of Tumbez eighty thousand inhabitants; and the Island of Puna, which scarcely now maintains two hundred souls, had then a population sufficient to war with Huayna Capac. Garcilaso de la Vega relates that the fortress and temple of Tumbez, which he writes *Tumpiz*, was built by Huayna Capac, to contain and overawe the inhabitants of Puna, for which purpose he placed there a governor, with a considerable garrison, and for the service of the temple appointed two hundred virgins, whose employment was to spin and weave the finest woollens used by the nobility. Among the curiosities kept there were a lion and a tiger, which were said to have been turned loose on Pedro de Candia, the first of Pizarro's companions who landed to survey the coast. Garcilaso's account of this incident is as picturesque as old Froissart's Chronicles. It seems Peter of Candia, a Greek, volunteered his services on the occasion, in these words—"I am determined to go alone, to see what is in this valley; if they kill me, you lose but a single companion—and if I succeed, our victory will be the greater." So saying, he put over his vest a coat of mail which reached to his knees, an iron helmet of the bravest in their possession, a steel buckler, with his sword at his girdle, and in his right hand a wooden cross a yard high, in which he trusted more than his arms, as being the sign of our Redeemer. The Indians, astonished at the lofty bearing and strange demeanour of this iron-clad apparition, "who moved," says Garcilaso, "as if he were lord of the Peruvians," to try of what nature he was, turned loose the above-mentioned wild beasts, which, instead of attacking him, came and fawned on him like dogs, and threw themselves at his feet. If we consider that the lion, or *puma*, of South America is, even in its wild state, a timid animal, and that both of them had been long tamed by confinement, there is nothing very miraculous in the incident, admitting

it to have taken place as related. The effect, however, on the Indians, we are told, was marvellous. They looked on Peter of Candia as one of the children of the sun descended from heaven. "With this belief," says Garcilaso, "they came and adored him as the son of their god, and conducted him to his temple, which was lined with plates of gold, that he might see how they worshipped his father in their land. After shewing him the temple, the service of plate, and all the wealth and ornaments belonging to it, they conducted him to the palace of his brothers the Incas, whom they considered like him the children of the sun. They led him through all the chambers, halls, and apartments with their golden tapestries. They shewed him the service of the Inca, which, down to the pitchers, pots, and jars for the use of the kitchen, was of gold and silver. They entered the gardens, where Peter of Candia saw shrubs, trees, plants, animals, and reptiles, as we have related was the custom in the royal gardens, imitated to the life; at all which the Christian was more astonished than had been the Indians at the sight of him." Chap. xii. vol. vi. Spanish Edition, Madrid 1804. There is a hut built near the spot where once, probably, stood the altar. What the Spaniards destroyed, and what they thus substituted, are thus placed in direct comparison.

On the 6th of Nov. I set off for Payta. This journey is performed by mules of the country, which can travel with little rest, little food, and little water. Having provided the necessary stock of provisions, and a large calabash to hold water, I took leave of my friends in Tumbez, and set off about midday with my Sambo guide.. The road crosses the two branches of the river, and passes immediately at the feet of the Inca's Temple, whence it diverges, following the low chain of cliffs towards the sea-beach. There is another through the interior, which is sometimes preferred, because a few huts are met with; but the scanty resources they can supply to the traveller are scarcely compensated by the increase of distance and the broken nature of the ground, consisting of dry ravines and *cerrites*, or little hills. Towards the evening we reached the beach at the point called *Malpaso*, "bad pass," because the foot of the cliffs is here washed by the tide, and it is necessary to wait for the ebb. We travelled along the bare sands till about ten P.M. when we halted where a patch of dry grass served to pasture the mules, lighted a fire, supped and slept till near day-break, when we continued our journey in the same manner along the beach. We halted to breakfast under a projecting cliff, and were continuing our march when we encountered a traveller from Payta who had stopped for the same purpose. He inquired my name, and gave me letters from Mr. Pflucker, and a packet from the British Consul, in which I found letters from my oldest and dearest friends in England, who could scarcely have imagined they would have reached me under circumstances so little resembling the ordinary events of our own country. The object in this day's journey was to arrive at a place called Mancora, where the first water is to be found after leaving the river of Tumbez. Toward the evening, after wandering a little bewildered on the deserts bordering the sea-beach, we gained the tract leading to the stream. My dog, who had been tormented all day by the heat and tantalized by the salt tide, seemed to be aware of our approach to fresh water; though much fatigued he ran forwards and had refreshed himself in the river some time before we arrived. The scanty streamlet of Mancora trickles through a thick grove of Algarobas, and though it is rather brackish, both ourselves and mules were well pleased with its taste. We stopt to sup on the open grounds above the watercourse, and expected to pass a pleasant night on the long dry grass, over which the breeze blew refreshingly; but we had scarcely lain down, when we were attacked by swarms of mosquitos, produced by the vicinity of the water, and thought it better to continue our journey by moonlight than endure their persecution. We had now left the coast and traversed a bare extensive plain till about ten the next morning, when

we reached an immense ravine, called *Quebrada Honda,* "Deep Glen." We descended probably one thousand feet to the bottom of what is a water-course, when rain falls, but was now a dry valley, shadowed with thickets of *Algarobas.* Here we found an inhabited house, procured a tolerable breakfast, and remained till the afternoon, when we continued our journey and came to the stream of Parimes, where there is a house inhabited by one of the dependants of the cattle-farm of this name. We then traversed a plain, similar to that we had already crossed, during greater part of the night, and after sleeping about three hours under some tufts of the "*Sapote de Perro,*" arrived in the morning at the village of Arnotape. It is only four leagues from hence to Payta. The whole distance I should calculate as follows:—

Tumbez to Los Corales	½	league
Malpaso	4	
Mancora	16	
Quebrada Honda	12	
Parimes	1	
Arnotape	10	
Payta	4½	
	48	leagues, or 144 miles.

The "*Denotero General,*" or "Itinerary of Peru," gives nearly fifty-five leagues, but the distance in a direct line, if the two points be accurately laid down in Banès' Map of Colombia, is two degrees, or one hundred and twenty miles, and I should not think the windings of the road exceed six, as the country is entirely level and open. We spent two days and a half betwixt Tumbez and Arnotape travelling the greater part of two of the three nights. The night is in fact the time preferred for passing the parched deserts of Peru, to avoid the glare of the sun, and be less incommoded by the scarcity of water; but if one suffers from heat by day, the chilliness of the night-breeze which blows constantly from the South on the whole line of coast, is scarcely less annoying. My guide complained frequently of being "*emparamado,*" as we traversed the table-land, after leaving the beach; and I was myself frequently inclined to sympathise with him. It is true one's feelings are not accurate estimates of the absolute decrease of heat. After the frame has been relaxed during the day, a fall in the thermometer of 5° or 6° makes an impression much more than proportionate to the real change of the temperature. The village of Arnotape is situated on the banks of the river Chici, a considerable stream which descends from the mountains of Loxa, and enters the sea about two leagues below the village. A general type will represent the whole Peruvian coast, as to cultivation and population. With intervals of from fifteen to twenty leagues, we find a river descending from the Andes, cutting the country more or less at right angles. There is a certain extent of alluvial soil cultivated on either side of it. Here is concentrated in towns, villages, or scattered farms, the population of the district. The intermediate space is a barren desert. It is over these intermediate barrens the government of the Incas had, by means of aqueducts from the mountains, spread agricultural abundance. The inhabitants are at present contented to extend this advantage merely to the alluvions adjacent to, and nearly on the level of the rivers. The soil is every where abundantly productive. In fact wherever heat and moisture can be united, there is no doubt of vegetable increase. Arnotape produces tropical fruits, *maize, gourds, pumpkins, melons, yuccas, Cametes* and *onions.* All these find a ready sale in Payta, especially the two last, which form articles of trade with the whalers. *Water* is also another branch of commerce. Payta is supplied from the river Chici, partly by the inhabitants of Arnotape, and partly by those of Colon, an Indian village, situated on the coast betwixt the mouth of the river and Payta. The naked barrenness of the country increases from Arnotape to Payta, till the prospect is nearly reduced to the elements of earth, sea and sky. It would seem as if the beauty of the two latter would com-

pensate for the sombre monotony of the former. The transparent atmosphere reflects a vivid light on the calm surface of the bay, where ships lie as on the bosom of an inland lake. The white line of surf, breaking heavily on the beach, reminds us however of the ocean's power, even when in repose, as the movement of a paw might indicate the strength of a slumbering lion. The appearance of the town is anything but prepossessing. It is built on the beach immediately under the cliff. Its thatched roofs, and brown walls form no relief to the colour of the soil, with which it harmonizes so well that it seems almost to have grown out of the cliff by a process of nature. There are two principal streets, not very wide, and the rest are mere lanes and passages. The greater part of the houses are mere Indian huts, but those of the principal merchants are commodious residences and the new buildings which are springing up like a crop of mushrooms, are all in a style of superior architecture and accommodation. I have seen in no part of South America, such marks of rapid improvement, as on this barren strand, which a few years ago was occupied merely by fishermen, and may be said to possess neither land nor water: for the latter, as I have observed, is brought from Colon and Arnotape, and the land produces absolutely nothing either for pleasure or profit; yet provisions are cheap and abundant. The certainty of a sale collects them from all the surrounding country. One naturally enquires the causes of this prosperity. One of them is doubtless its commodious harbour, which is resorted to by all the whale ships of the Pacific. Here they purchase *Onions, Cametes* and fresh meat, before they proceed to water at Tumbez. It is also a port of importation for a very considerable extent of country. Manufactured goods are purchased here to be conveyed to Puira, which is a kind of commercial depôt, from whence they are distributed through the mountain country of Loxa and northern frontier of Peru. Returns are made in bark, hides, and cash. Mere situation however would but imperfectly account for the prosperity of Payta, the chief cause is, the freedom enjoyed by commerce, we may say more from the indifference, than direct permission of the government. As long as the trade was considered of little importance, it was left to be managed as the inhabitants thought fit; this was sufficient to give it its present increase, and an easy method of doing business once established, all parties find their interest so immediately connected with its continuance, that the attempts of the government to interfere have been hitherto useless. Smuggling is so well systematized, that the import duties diminish much in the same ratio as the trade increases.

Another circumstance has contributed greatly to vivify the commerce of the coast in general: it is the abolition, since the downfall of the Spanish system, of the monopoly enjoyed by the Capital. The plan of concentration was agreeable to a form of government, the object of which was rather to overlook and restrain, than extend the commerce of its colonies; but that the essential advantage of Payta consists in its freedom, is made evident by the recent decay of Guayaquil, where burthensome duties and a harassing and dishonest financial system have not only checked the increase of trade, which followed the independence of the country, but have nearly annihilated it altogether. I was hospitably received in Payta by Mr. James Tabora, the principal native merchant of the town, and had the pleasure of meeting General Illingret, as well as several Englishmen and North Americans, settled there for commercial objects, whose society was the more agreeable after the dull monotony of my existence in Tumbez. The *idler* however finds but few resources in a town devoted to commercial pursuits. The shrubless, grassless plains which extend around it, present no attractions to compensate for the fatigue of walking under a burning sun. The beach with its rocks, shells and sea-weeds, offers a more pleasurable ramble; but even the majestic ocean as a perpetual object, would, I

believe, be often gladly exchanged for the variegated aspect of terrestrial nature. The formation of the coast is rather curious. Its mean elevation above the sea is about one hundred and fifty feet. The surface consists of an indurated paste of fossil shells, mixed with decomposed clay-slate, the strata of which, rising at an angle of about 45°, form the body of the coast. They are intersected by veins of quartz, often of a considerable thickness, and, as the slate decays, masses of this substance, frequently of several tons weight, are separated and left bare on the beach. A different formation appears to the east of the town, where we find the shore composed of horizontal layers of clay, mixed with considerable quantities of sulphate of lime in crystallized fragments. It will be observed from the composition of the soil, that it is far from being naturally barren. The almost entire want of water is the sole cause of its sterility. When a few showers occasionally fall, it is immediately covered with vegetation, the remains of which linger in the ravines till renovated by the next year's showers. I found here the "*Sapote de perro*" dwindled into a shrub; a few specimens of the tree described at Tumbez, in the same state; a few *Mimosas;* a species of *Solanum;* two or three syngenesious plants, and a shrub, scattered in tufts among the rocks, which, by its crimson blossoms, formed the pride of the Paytenian Flora.

I remained in Payta from the beginning of November till the middle of January. In the mean while, a change had taken place in the Equatorial Cabinet, by the accession of a new minister, who was desirous to give the government what it much wanted, a character of *liberality*. A decree was accordingly passed, granting permission for the exiles to *return*, and declaring *oblivion* of all the past; a convenient doctrine for the oppressor, who expected that after having been banished, without form of trial or shadow of guilt, and subjected to all the penalties and vexations attendant on such a state, we should feel *grateful* for the permission to return, without satisfaction for our losses, or reparation for our characters. It is true a government so disgraced could not throw much discredit on others, against whom no crime could be urged beyond the suspicion of participating in the general disgust occasioned by its measures. Flores had certainly the greatest reason to enjoin *forgetfulness;* but there are deeds which must needs be remembered as long as the injuries they occasion are unatoned or unavenged. Being aware of the publication of the amnesty, I was desirous to obtain a passage in the United States' sloop of war, the Falmouth, then on the point of sailing from Payta for Guayaquil. The Captain, with whom I had a slight acquaintance, would willingly have given me a berth; but on consulting his instructions he found them very positive against affording any assistance, *from motives of humanity,* to persons implicated in the political disturbances of these countries. I confess both the manner and matter of these instructions seemed to me little in harmony with the policy of a free goverment. We may consider a more exact estimate of the nature of political crimes as one of the legislative discoveries of the present age. In countries torn by revolutions, it is often difficult for the most impartial observer to pronounce which party has most reason on its side: and it would be frequently hazardous, if not criminal, to condemn the conduct of either, merely because it may have been momentarily overthrown and exposed to persecution. Amid the storms and whirlwinds of political passions, conscience is frequently enlisted in behalf of the most extravagant projects; and certainly there is no class of errors in excuse of which may so frequently be pleaded the palliative of good intentions. Few men expose themselves to death and danger in the arena of political discord from sheer *malice prepense,* and from a design to injure their fellow creatures. One could scarcely, therefore, have expected they should be selected as the class in whose favor *motives of humanity* should never be allowed to militate. There can be little difference in discrimi-

nating betwixt the principle of non-interference, which belongs strictly to foreign nations, and that casual protection a neutral flag may afford a persecuted fugitive, whose very enemies may the next day require the same friendly succour. These reflections are rather general than applicable to myself, for though I certainly had been banished from the Equator, I appeared in Payta in no political character whatever, nor had the Captain of the Falmouth any reason to know me as an exile, except through report, with which he had officially nothing to do. Luckily, the Lima, a whale ship of the United States, was sailing at the same time. Capt. Onslow had no instructions from his government; and I am convinced if he had, he would have thrown them into the sea, had they interfered with his doing what he considered a generous action. He not only took me on board to Tumbez, but would have sent one of his boats with me to Puna, had I not found another conveyance. I shall ever gratefully remember the sterling kindness of this honest American, who not only made his ship as comfortable to me as possible during the few days I was on board, but pressed me to accept assistance of money, and every thing which the vessel contained, when I took leave of him. On the 19th of December I got on board a bongo, laden with *Cametes*, bound from Tumbez to Guayaquil, and arrived, on the 21st, at Puna, after a villainous passage; the minutiæ of which might figure well enough in a journal, or make a tolerable chapter in the "miseries of human life;" but bad travelling, both by land and by water, is too much a matter of course in Colombia to deserve particular notice. I stopped a night at Mr. Cope's country residence in Puna, and next day proceeded in his canoe to Guayaquil. Here I remained a few days to enjoy the society of my English friends; and on the 29th of January, 1833, set out for Quito.

The series of observations on the Quitinian Andes, now concluded, were communicated to me by their talented author early in 1834; and in the autumn of the same year some of the papers were read, and excited considerable interest, at the Natural History Section of the British Association for the advancement of Science at Edinburgh. It was then that Mr. Pentland, so well known for his scientific researches in South America, communicated to me the melancholy tidings of Colonel Hall's death, which occurred during an insurrection in Quito. This intelligence was confirmed by a letter which I received from the widow of this lamented individual, residing at Addlestone, near Chertsey, Surrey; but who had been herself unable to obtain any particulars relative to his death. About the same time, my valued friend and relative, W. Turner, Esq., British Minister at Bogata, in Colombia, in a letter to me, dated August 26th, 1834, briefly alludes to this melancholy event:—"I am sorry to say poor Hall was killed, six or eight months ago, in a Revolution at Quito; an event equally surprising and distressing; for I am told he was a sensible man; and I am always astonished how any Englishman can interest himself in the miserable personal politics of this turbulent people, especially as, in case of reverses, foreigners are quite sure to be the first victims."

Nor have I been able to receive any further intelligence till the present time. In a letter now before me, from Dr. Jameson, dated Quito, 18th of February, 1835, that gentleman says "It is now more than eighteen months since I had the pleasure of hearing from you; neither could I have written to you during that period, because all communication with this part of the country has been cut off, in consequence of a revolution which broke out in Guayaquil, in October, 1833. However, I believe that now we shall remain quiet for some time to come. The party which governed this department, (and which was a mere faction) has just suffered a signal defeat. M. Rocafulte has consequently been placed at the head of

the government, and being endowed with liberal principles, is, in my opinion, well calculated to promote the interests of the country. My poor friend Hall fell a victim at the first breaking out of the Revolution; and you cannot imagine how sensibly I felt his loss, he being the only person in this part of the world for whom I had formed a sincere attachment. As a man of high scientific acquirements, he would have been highly useful to you. In August, 1833, I sent you a considerable collection of plants, furnished exclusively by himself, with an account of several expeditions he made, accompanied by M. Boussingault, to the volcanoes of Pichincha, Antisana, Cotopaxi, and Chimborazo, on which latter mountain they reached an elevation of above 19,000 feet, or upwards of 300 and odd feet above the point ascended by Humboldt. Let me know if it reached you safely."

The MSS. has been safely received, and I cannot give a better proof of the value I set upon it, than by laying it before the scientific public, at the very earliest opportunity; and I shall close this subject with a few particulars, chiefly extracted from a letter from his accomplished widow.

"Colonel Hall quitted England for South America in 1820, and fourteen years of separation, gilded by hope, have terminated in bereavement for ever! I presume you know that he published 'Travels in Canada and the United States,' in 1816 and 1817, and 'Travels in France,' in the following year. From the former country he brought many plants of the hardy kinds, (but mostly, if not all, were already known in this country), many of which are now flourishing in this neighbourhood. I do not think he studied the science of Botany, though he appeared to be well acquainted with it, till he visited those regions teeming with the grand, beautiful, and magnificent. On referring to the last two letters I received from him, (dated in March and August, 1833,) I found the following:—'You must know I have been banished from Quito, and am but lately returned. The actual government of this Republic of the Equator is one of the most villainous and most detested that can be picked out of all the bad South American governments. It happened to get into a war, or rather squabble, with that of Bogata, and when on the point of being attacked, in September last, got dreadfully frightened with the apprehension of an internal revolt. It did me the honour to suppose I had much influence here, as I cordially despised both it and its proceedings. I was accordingly one evening seized in my house, by a party of soldiers, and sent out of the Equatorian territory into the Peruvian, which nearly touches on Guayaquil. I went as far as Payta, and after five months' absence returned, because the Government, being able to prove nothing against me, thought fit to make a display of liberality. Several of the most respectable Englishmen were banished at the same time, and with the same regard to justice. I am preparing to send to Dr. Hooker an account of my excursions by Boussingault to Chimborazo, &c., and shall include my trip to Payta. I shall endeavour to send a collection of plants to Humboldt, to whom I remitted a parcel by Boussingault, who long ere this must be in France.'

"The last dated one prepared me for the fatal event which ensued.—'And so having nothing to hope for from England, I have taken the cause into my own hands. You will ask what I shall gain by this trouble? Nothing, perhaps, save revenge for my own wrongs, and liberty for a people who scarcely deserve it: besides,' (and this concluding sentence does no less credit to his heart than the line of conduct he pursued was destructive to his own peace and happiness, and even to his life;) he concludes, 'my respect for Chimborazo made me feel an interest in the condition of the inhabitants; and, as something good in man, amid a great deal of what is bad, is found every where, our social feelings are always liable to be called into action without any direct reference to present advantage.'"

Colonel Hall's ardent love of liberty, and an almost prophetic anticipation of his own impending fate, are not inelegantly pourtrayed in the following "Address to Nemesis," written when, banished by the government of Quito, he sought peace, but found it not, in the sequestered valley of Tumbez. (See p. 71.) "Here," he says, "after I had visited the only interesting spot in the neighbourhood, collected specimens of its scanty Flora, and wandered over every part of a circle of which the village was the centre, and the radii about four miles in length, being as much as could be conveniently traversed on foot in a tropical climate over burning plains, I began to feel as weary as a life so stagnant, aimless, and isolated, could make one so situated. The news from Quito was by no means cheering. The army of Bogata had taken possession of the disputed frontier, and was stationed at not more than seventy miles from Quito. It might have been expected the inhabitants would have profitted by the occasion to shake off a detested yoke. They did nothing. Flores and Ovando, after having mutually bandied the accusation of the murder of Sucre, and a thousand other villainies, met, embraced, made presents of embroidered coats and swords, and swore eternal friendship. In short, I grew, in Falstaff's phrase, as 'melancholy as a lugged bear, or an old lion, or a lover's lute;' and being melancholy, grew poetical, as the following lines will witness, which, if very bad, will prove that there is nothing Castalian in the river of Tumbez."

1.

"O Nemesis, fate, fortune, whatsoe'er
We name thy power which enslaves this ball,
Thou hear'st no human sigh, no human prayer,
Yet unto thee, stern arbitress! I call,
And pour the potent breathings of despair;
For so am I thy equal, and disdain
To sue for mercy, while I yet can bear,
As I have borne, thy adamantine chain,
And by endurance waste its fiery links of pain.

2.

Thou hast dealt hardly with me, from thy urn
I have drank only poison, till the draught
Has grown familiar, that no more I turn
My lips to shun thy chalice. I have quaff'd
The bitterness of life, and if we learn
Patience by suffering, there is in my soul
No passion which has strength to rage or burn,
But apathy o'ersheds her dead control,
As sleeps in icy rest the ocean of the pole.

3.

How have I earned this penance? Have I spilt
Innocent blood, or banquetted on tears
Of widows and of orphans? Have I built
Pow'r upon human wretchedness and fears;
Or with hypocrisy and fraud o'ergilt
Baseness of heart and violence of hand;
Or grasped revengefully the dagger's hilt?
That on this burning desert I should stand
An outcast of the earth, an exile from the land!

4.

The land, for whose sake, country, home, all ties
Dearer than life to man, for me are made
As though they ne'er had been; phantoms that rise
To haunt my slumbers, or perchance upbraid
My waking thoughts, but never glad mine eyes,
For Time sweeps darkly onward, as the wave
Rolls o'er the wreck, that rotting piecemeal lies;
Soon let his wings o'ershade my lonely grave;
Better in dust to sleep, than live and be a slave.

5.

Oh, Liberty! art thou the Enthusiast's dream,
The Poet's vision, Politician's spell,
To dazzle mankind with a wordy theme,
Then plunge them deeper into Slavery's hell?
Still have I followed thy phosphoric gleam,
Believing, though despairing:—all around,
Like pale ghosts on the brink of Lethe's stream,
Nations are gathered, struggling, weary, bound,
Gasping to taste thy streams, still sought and still unfound.

6.

With victims art thou worshipped; with the groans
Of martyrs, fondly dying for their creed,
While despots, lolling on triumphant thrones,
Insult their faith and banquet while they bleed:
Does Glory gild their monumental stones,
Or Fame pierce through the sepulchre's cold gloom?
Too oft Oblivion shrouds their trampled bones,
And Fate pursues them e'en beyond the tomb;
All this I *should* have known, nor tempted thus my doom.

7.

Then had I built my nest in the lone vale,
Of calm Obscurity,—unnoticed there,
My bark of life had spread her quiet sail,
As noiseless as a bird's wing through the air,
Beyond the ravings of the ocean's gale,
Or mid the glorious relics of old times,
Fallen temples, ruined towers, and cloisters pale,
Such as make holy, Earth's romantic climes,
My pilgrimage had been, unmixed with human crimes.

ILLUSTRATIONS OF INDIAN BOTANY.

By Dr. Wight & G. A. W. Arnott, Esq.

(Continued from p. 39.)

TRICHOLEPIS CANDOLLEANA.

TAB. IV.

Caule ramoso diffuso, ramis angulatis, foliis oblongo-lanceolatis spinoso-serratis epunctatis supra glabris subtus farinoso-puberulis, involucri ovati squamis subaraneosis, appendice subulata spinescenti innocua glabra, pappi serie interno paleaceo exterioribus capillaribus, paleis setisque ciliolatis.

Tricholepis Candolleana. *Wight, Cat. n.* 1495.

Carduus ramosus. *Roxb. Fl. Ind. v.* 3. *p.* 406.

Carduus Indicus. *Roxb. in Cœt. Merc. Angl. Ind. Or. Mus. tab.* 420.

DESCR. *Root* annual, simple, perpendicular. *Stems* short, branched, diffuse, angled and striated, somewhat glabrous. *Branches* forked; the whole plant from one to two feet high. *Leaves* scattered, sessile, not decurrent, oblong-lanceolate, tapering towards the base, where they are occasionally again dilated, and embracing the branches, entire, or sometimes slightly lyrate, serrated, the serratures thorny, upper side in all our specimens glabrous and free from dots, under also nearly glabrous or slightly puberulous (downy according to Roxburgh). *Heads* of flowers shortly peduncled, not bracteated. *Involucre* many-flowered, ovate, the scales imbricated, oval, covered with an almost imperceptible webbed down, ending in a longish setaceous, glabrous, spreading or recurved, subulate, rigid, but inoffensive appendage. *Corollas* thickish, all tubular, and containing both stamens and pistil, five-cleft, regular, or nearly so: segments oblong linear. *Stamens* scarcely exceeding the tube of the corolla (in the accompanying figure they are represented longer than either Mr. Arnott or I have observed them); filaments papillose: anthers caudate at the base, the caudæ small and jagged; the appendages at the apex or alæ (production of the connectivum beyond the cells) are linear, oblong and acute. *Style* filiform, bifid, enclosed within the anther-tube, thickened or knotted below the cloven portion, and there bearing a crown of numerous longish hairs; segments linear, obtuse, puberulous on the outside; with two obscure lines on the inner, reaching to and coalescing at their apex. *Fimbrillæ* of the rachis cleft into several slender bristles. *Bracteoles* wanting. *Achenium* oblong, angled, ribbed and tubercled on two of the contiguous sides, smoothish on the other, not beaked, crowned with a narrow, marginal ring. *Pappus* situated within the ring of the fruit, composed of several rows of bristles and paleæ; the outer ones are shortest and most slender; the inner considerably longer and broader; all are slightly ciliated on the margin. The hilum or rather callosity attaching the achenium to the rachis is slightly on one side.

The specimens figured were from the hill of Narthamela, in the Salem district. Mr. Arnott, (who has assisted me in the above description,) as well as myself, has little doubt about this being *Carduus ramosus* of Roxburgh; whether the *C. radicans*, Roxb. (*Tricholepis radicans*, De Cand. Prod. v. 5. *ined.*) be really distinct, we cannot at present determine, as my specimens are now with M. De Candolle; but in the manuscript character of that species sent us by De Candolle, and in the description given by Roxburgh, the leaves are apparently narrow, and dotted on the upper surface, and the appendages of the involucral scales said to be more slender. *T. radicans* is a Mysore plant, and was only known to Roxburgh as cultivated in the Botanic Garden of Calcutta.

Fig. 1. Floret. 2. Floret laid open. 3. Achenium. 4. Section of ditto:—*magnified.*

WEDELIA CALENDULACEA.

TAB. V.

Herbacea annua basi repens, ramulis erectiusculis subsimplicibus, foliis oblongo-lanceolatis subsessilibus basi attenuatis versus apicem serratis strigosis, pedunculis ex axillis superioribus vel terminalibus solitariis elonga-

tis monocephalis, involucri squamis 5 uniseriatis oblongis obtusis dorso pubescenti-strigosis, paleis mucronato-apiculatis, acheniis exaristatis.

Wedelia calendulacea. *Lessing, Syn. Comp. p.* 222. (now *Rich.*) *Wall. Cat. n.* 3205. *Wight, Cat. n.* 1447. *De Cand. Prod.* 5. (*ined.*)

Verbesina calendulacea. *Linn. Sp. p.* 1272. *Willd. Sp. Pl.* 3. *p.* 2226. *Roxb. Fl. Ind.* 3. *p.* 440; *in Cœt. Merc. Angl. Ind. Or. Mus. tab.* 978. *Wall. List, n.* 2305.

Jaegeria calendulacea. *Spr. Syst. Veg.* 313. *p.* 590.

Caltha, &c. *Burm. Thes. Zeyl. t.* 22. *f.* 1.

Pee-cajoni. *Rheed. Hort. Mal.* 10. *t.* 42.

Descr. Annual. *Stems* creeping at the base; the branches nearly erect, terete, from one to four feet long, slightly scabrous, or almost smooth. *Leaves* opposite, oblong-lanceolate, sometimes nearly quite entire, sometimes with a few coarse, rather distant serratures near the apex, with intermediate gradations on the same branch, strigose on both sides, the hairs on the upper often proceeding from little shining, shallow, saucer-like pits. *Peduncles* solitary, either from the axils of the upper leaves, or terminal, longer than the leaves, terete, slender, erect, or bending from the weight of the head of flowers, slightly hairy. *Heads* solitary: involucre composed of a single series of five narrow, oblong, bluntish scales, which, like the leaves, are strigose on the back, and with saucer-like hollows on the upper side. *Flowers* yellow; those of the ray in a single series, numerous, bearing a pistillum without stamens; *corolla* strap-shaped, three-cleft; those of the disk several, tubular, five-cleft, with both stamens and pistillum. *Bracteoles* of the rachis (or scales of the receptacle, *Linn.*) oblong-lanceolate, cuspidate, concave, longer than the ovary. *Anthers* not caudate, purplish, longer than the tube. *Ovary* oblong, crowned with a short-lobed membranaceous cup, without any awns or bristles. *Style* filiform, bifid; the branches longish, linear, recurved, terminated at the apex by a short cone, pubescent on the outside, principally so at the base of the cone, less so both upwards and downwards, furnished on the inside with two strongly-marked lines (rows of the stigma) reaching to the base of the cone. *Achenia* covered with a thick nut-like coat, compressed, tumid on the margins, without any beak, crowned as in the ovary, and furnished with a minute epigynous disk: those of the ray and disk are alike.

Hab. In moist pastures, and by the sides of ditches. Frequent in the Tanjore country, flowering the greater part of the rainy and cool season.

(To be continued.)

BOTANICAL INFORMATION.

(*Continued from p.* 20.)

Mr. Hewett Watson is now printing a new *Botanists' Guide*, on the model of Turner and Dillwyn's, omitting the Cryptogamic plants; the first volume of which, including England and Wales, will be ready for publication in a few weeks. A second volume, devoted to Scotland, will shortly follow; for which Mr. Hewett Watson is anxious to receive such information regarding the stations of the rarer Scottish plants, as the Botanists of that country may be willing to communicate to him. The work will be compressed into as small a bulk as possible, consistently with the greatly increased number of species and stations, which Mr. Watson's own researches and the communications of others have enabled him to add in many of the counties. Mr. Watson has also in preparation a work on the distribution of British plants, chiefly in connection with latitude, elevation, and climate in Great Britain and elsewhere; the first part, containing general observations on the climate of Britain and the distribution of plants in connection therewith, is almost ready for the press. A second part, embracing a detailed notice of the distribution of each species, is in progress.

VOYAGE TO JAPAN.

By Ph. Fr. de Siebold. *(Botanical Part.)*

Dr. Zuccarini, of Munich, has circulated the following prospectus respecting a Flora of Japan. "FLORA JAPONICA, sive Plantæ quas in imperio Japonico collegit, descripsit et parte in ipsis locis pingendas curavit Dr. Ph. Fr. de Siebold: Sect. prima, continens Plantas ornatui vel usui inservientes." "Of all the countries of Asia," says M. Zuccarini, "Japan and China were, till lately, the least accessible to the scientific researches of Europeans, especially as regards their natural history. Of China we know little beyond the information collected during various commercial or political expeditions, which is necessarily vague, owing to the extremely suspicious disposition of the natives. It is true that Thunberg and Kæmpfer succeeded in obtaining correct details on those more limited islands which compose the kingdom of Japan; still their publications exhibit many proofs of the severe restrictions and difficulties under which the authors laboured. We hope, therefore, to forward the cause of science, by announcing a work which shall afford universal information on the botanical productions of this country, the result of an expedition that was undertaken and completed under the most advantageous circumstances. M. Siebold's voyage to Japan is generally known. During his long residence (from 1823 to 1830) in this empire, he was enabled to explore the country more fully than any of his predecessors. The Botanic Garden, established at Dazima in 1824, by order of the government of the Belgian East Indies; the journey which this Naturalist made to the Imperial Court at Jedo, two years after, when he accompanied the Dutch Embassy, and the connexion which he formed with the natives, have all been favorable to his botanical researches. Especially, during his expedition to Jedo, he took the opportunity of cultivating an intimate acquaintance with the most eminent physicians and naturalists in the country. To their diligent aid he owes the collection in his herbarium, and, in the Botanic Garden, of the plants found in the different provinces of this empire, and the successive accumulation of about two thousand species, which he not only examined on the spot, but caused, in great part, to be drawn by different European and Japanese artists, whose designs amount to upwards of seven hundred in number. Fruits, seeds, and other remarkable portions of plants, mostly preserved in spirits of wine, with specimens of woods, of medical preparations, and of such materials as the vegetable kingdom affords, for commerce and domestic use, render this collection still more valuable. Finally, the discoveries made, subsequently to M. Siebold's departure, by M. Bürger, and attested by the many and highly interesting collections which he has transmitted, afford the most certain assurance of the satisfaction of our wishes.

In Japan, where agriculture and horticulture, in their various branches, had attained to such a degree of perfection as to supply the wants of the inhabitants, at a period when little attention was paid to them in Europe, all researches, tending to elucidate these subjects, must infallibly prove of unusual interest. With this view the Botanic Garden of Dezima was chiefly stocked with such plants, whether indigenous or introduced from China, Corea, and other adjacent countries, as were peculiarly interesting for utility or ornament; and there, too, was collected the information which could be obtained from the natives and from the extensive literature of Japan. The extent and importance of these materials have induced us to form a separate publication of them, which will constitute the first part of the Japanese Flora. It will be the more interesting to amateurs, as, of many centuries of these plants, conveyed in a living state, by the author, to the Low Countries, the larger portion succeed perfectly well in the open air or in cool stoves; from which circumstance we may hope to see them soon disseminated in our gardens.

The work will consist of forty Fasciculi, to appear monthly, each containing five plates and two or three sheets of Latin and French description; the former giving the botanical details, and the latter an abridged account of every plant, its history, use, and culture in Japan, and the mode by which it may be acclimatized in Europe.

The second part of the work will be of similar size and style of printing with the first, and contain a complete enumeration of all the plants collected in Japan by M. Siebold, with detailed descriptions of the new and doubtful species, and such plates as may be needful for their elucidation. Many rich herbaria, formed by skilful Japanese Botanists, in countries hitherto inaccessible to European Naturalists, and illustrated by many interesting observations, together with M. Bürger's collections, will enrich this portion of the work."

A new work upon Indian Botany, to be published in Amsterdam, is announced under the title of

RUMPHIA,

SIVE COMMENTATIONES BOTANICÆ, IMPRIMIS DE PLANTIS INDIÆ ORIENTALIS, TUM PENITUS INCOGNITIS, TUM QUÆ, IN LIBRIS RHEEDII, RUMPHII, ROXBURGHII, WALLICHII, ALIORUM RECENSENTUR,

Auctore C. L. Blume, cognomine RUMPHIO.

PROSPECTUS.

"At a period when late political events have disturbed the peace of nations in general, and specially endangered that of our country, whose prosperity had been hitherto unrivalled, M. Professor Blume had commenced, at Brussels, the publication of his great and important work, entitled *Flora Javæ*. The unexpected dismemberment of Holland and Belgium necessarily suspended this publication, in which government took a considerable interest: but every thing has a limit; peace and confidence will assuredly return to our country: the doubts of diplomacy will shortly be dissipated, and we cannot hesitate to believe that the author, as well as the editors, of the FLORA JAVÆ, will then speedily resume their labours at the point where they were obliged to suspend them, and fulfil to the numerous subscribers those engagements which they must have ever considered as of inviolable obligation. We may state while on this subject, that not only all the manuscript is in the Publishers' hands, but that measures have been arranged among them to ensure a free circulation for those fasciculi which will terminate the work.

"It had entered into M. Blume's projects to extend his publications beyond the Flora of the Island of Java, and to give, successively, the results of his laborious investigations in the immense Indian Archipelago; adding to his special attention to that island, which he had longest inhabited, all the discoveries which he has been enabled to make, all the facts which he has collected relative to the botany, statistics, and vegetable physiology of many regions, the study of which is the more important as they are situated very remotely from our possessions, and have, hitherto, been only visited by very few Naturalists, under peculiar and highly favored circumstances. Professor Blume has been in an advantageous position for scrutinizing nature, during all seasons of the year, and for verifying, by numerous and exact experiments, the correctness of the observations made by others; so that we may expect to receive a satisfactory account of all those subjects which he intends to discuss. Nothing of importance that is contained in the valuable works of Rheede, Rumphius, Roxburgh, and Wallich has escaped M. Blume's notice; and his projected work may be justly considered as likely to put the finishing touch to those of the illustrious Botanists who have preceded him in this career, and to fill up the deficiencies which the hitherto imperfect state of science had obliged those writers to make.

"In order to give to the Phytology of India an air of similarity, which must increase its interest, Professor Blume intends

that his new work shall appear in the same form as the *Flora Javæ*, adorned with plates of similar style, and printed in the same type. He has entrusted the execution of the book to us, and it will be our ambition to render it equally worthy of public patronage as the Javanese Flora.

"This is the plan which the Author intends generally to follow in his new collection, which he entitles RUMPHIA, from the name of the learned Rumph, the Dutch Resident at Amboyna. This title is a happy innovation, an homage offered to the memory of one of the most learned men in the seventeenth century, that true disciple of nature, who, without any other teacher, could describe and delineate so beautifully the plants of the Moluccas, and who, after having suddenly been deprived of sight at the early age of forty-three years, could still derive, by the aid of touch alone, and by the most energetic application of memory and intelligence, that information which gladdened the most important half of his career. The *Rumphia* will comprehend all the rarer and most interesting plants of the Indian Archipelago, each being carefully delineated, from drawings made on the spot by a faithful and well-skilled pencil, and followed by such descriptions as may be expected from the pen of M. Blume, accompanied by minute analysis, and by a physical and natural account, as detailed as the circumstances of our state of knowledge will enable us to obtain, of its medicinal and useful properties.

"The work is so arranged as to convey a full and extensive idea of a vegetation, whose peculiarity must be eminently striking to an eye long skilled in the observation of our calm and regular climate. To attain this object, M. Blume has mingled his brilliant representations of plants with general views of the vegetable productions of a country where this department of nature attains its greatest luxury and development. These drawings have been made on the spot, and will lose nothing in being rendered by M. Lauter's well-practised lithographic crayon.

"The extraordinary difficulties under which Professor Blume has laboured, while compiling the materials of this work, form a strong claim on the patronage of the scientific public, who will know how to prize the results of such learned and perilous researches."

C. G. Sulpke, Bookseller, Amsterdam.

UNIO ITINERARIA.

Our latest intelligence respecting the *Unio Itineraria* bears date the 10th of June, of the present year, 1835, and assures us that the collections that have been made by the Egyptian and Arabian travellers at the island of Cephalonia, on the coast of which they suffered shipwreck, have been received, and will be distributed amongst those who subscribed to the Algiers expedition, as a remuneration for the scanty produce it yielded: but as there are nearly one hundred specimens of each individual species, the remainder is to form an addition to the Egyptian and Arabian collections, if the subscribers to the latter agree to add ten shillings to the original amount of that subscription.

According to the latest accounts, Mr. Schimper had left Cairo on the 2nd of March, 1834, with three men and sixteen camels, for Mount Sinai; reached Suez on the 8th, and arrived afterwards at El Tor, where the Arabian mountains commence. Dr. Wiest, the other traveller, remained at Cairo, entertaining, unfortunately, the idea of the plague not being contagious, and boldly attended the hospital, without being affected by the disease: but when on the point of starting for Gedda in Arabia Felix, he was seized with it, and it proved fatal to him.

Two cases with Egyptian plants, besides Zoological objects, have been dispatched from thence in the latter part of last February, but are still undergoing the long quarantine of seventy days at Venice, where the Austrian Government has issued orders to pay the most careful attention to the contents of these packages, so as to insure them against any damage.

In order to support this undertaking the more effectually, an increased number of subscribers is most desirable.

Collections of plants from Chili and Juan Fernandez, made by Dr. Bertero, in the years 1828—30, are likewise offered by the Unio Itineraria: viz., collections of two hundred species at £3, or one hundred species at 30s., being named either by the late Dr. Bertero or Dr. Steudel. They will also be supplied with numbers on their tickets, and the more exact determination of them will afterwards appear in the Regensberg Botanical Journal, with which these numbers will correspond.

Caucasian and American specimens of plants at 22s. per hundred; and collections of Caucasian specimens only, to the number of one hundred and seventy species, at 40s., are still to be obtained.

COMPARISON BETWEEN THE UPPER, OR TERMINAL LINES OF TREES AND SHRUBS IN BRITAIN, AND THEIR GEOGRAPHIC EXTENSION TOWARDS THE ARCTIC REGIONS.

By H. C. Watson, Esq. F. L. S.

In the extreme South-west of Cornwall, the mean annual temperature of the British coast appears to rise so high as 52° Fahr.; on the South coast of Hants, it may be estimated as 51°; and at the mouths of the Thames and Severn, as 50°. Hence it decreases northwards, until we have it scarcely 48° at the mouth of the Forth; and probably it is not more than 45° or 46° on the North coast of Scotland. The interior of the country, however little elevated, has a lower mean temperature than the coast under the same latitude, amounting to 1° or 2° of Fahrenheit, according to distance, and still more if at all elevated. About the bases of the mountains, and in valleys lying between high hills, the temperature is usually lower than in the open countries, but such situations are liable to great differences of climate from configuration and local position, so that neither latitude nor altitude can there give a satisfactory clue to the real temperature. Moreover, very little is ascertained regarding the decrease of temperature, in proportion to height above the sea level. It has been stated as 1° for seventy yards, for eighty yards, and for ninety yards. (*Mag. Nat. Hist. VII.* 493.) Adopting the medium scale of eighty yards, and taking 48° as the average temperature of the coast in lat. 53—56°, and 47° in lat. 57—58°, we find a temperature of about 29° for the highest point of Scotland, 33° for that of Wales, and 35° for that of England. The full range of mean atmospheric temperature in Britain may therefore be stated at 52—29°. In general, it may also be said, that the mean temperature of the three coldest months (Dec., Jan., Feb.) is 10° below that of the degrees above. But on the coasts, and especially on the western coasts, the differences are less; while in the inland counties, perhaps (more particularly those bordering the Thames, and thence to the Trent,) the three winter and three summer months are 11° to 13° below or above the annual mean. To the greatest height at which accurate observations have been made for a sufficient period, (Lead Hills, in Lanarkshire, at 1,280 feet,) these general conclusions hold good, as to the comparative temperature of the seasons; but the application of them to greater altitudes is mere assumption. In low situations, the air and earth have nearly the same temperature; but in ascending the mountains, the latter is found to cool more slowly, probably losing 1° of temperature for about one hundred and twenty-five yards of ascent.

As to the humidity of the air and quantity of rain, both are less on the East than on the West side of the island, and, in general, both increase about the mountain tracts. It is possible that a less quantity of *rain* may fall at great elevations, than in the valleys, or on the western declivities of the mountains; yet, from the frequency of mists, and constant deposition of moisture, owing to ascending currents of warm air, the climate is more humid than below. The general conclusion to be drawn from

this is, that we have the greatest summer heat, driest atmosphere, and smallest quantity of rain in the inland counties of the South-east of England; and that the summer temperature decreases, and humidity increases, in whichever direction we proceed hence; the winter temperature remaining comparatively little changed, until we attain several degrees of northern latitude, or ascend the mountains. The greatest vigour of vegetation is consequently seen in the South-east of England; but plants impatient of severe cold, and not requiring much heat, are best preserved on the South-west coast; those injured by heat and drought, as alpines, grow best in the North-west of England and Scotland.

With regard to the influence of local position in extending or contracting the ranges of plants, much more might be said than it is convenient here to occupy space with. Suffice it to observe on the upper limits, that the summits of mountains being less favorable to vegetation than their declivities, species are found in the latter situations at altitudes which they do not attain in the former, that they fail earlier on northern than on southern declivities, and that all (unless very small) species grow at higher elevations when sheltered from winds by rocks or other skreens. On the contrary, bleak summits, northern exposures, patches of snow, cold springs, dripping rocks, streams and waterfalls, morasses and woods, keeping cool the air and often filling it with moisture, bring down the lower lines of species. But the similar conditions do not always depress the upper lines in the same degree as they affect the lower, and hence in one place species may meet, which are wide apart in other situations. The influence of mountain springs remarkably exemplifies this: tempering the summer heat, they bring down the lower lines of some species; while, by preserving a superior temperature in winter and spring, they appear to raise the lines of others.

The highest mountain in Scotland, Ben Nevis, rises to 1,455 yards; Snowdon, the highest hill in Wales, to 1,190 yards; Scawfell Dikes, the highest summit in England, to 1,055 yards. The upper lines of such species, as attain nine hundred or a thousand yards in Britain, will, consequently, be better seen in Scotland than in England; but those attaining only to a moderate elevation, as five hundred yards or less, will usually be found higher in England and Wales. Plants rise higher in the South and East highlands than near the West coasts, and higher on the West hills than in the North of Scotland. The inferior lines for the most part agree with this, descending lower in the West and North. Duly keeping in mind the liability to such local changes, we may arrange the native trees and shrubs of Britain in the following stages, according to their terminal lines.

1. Species found only in the South of England, rarely, or never seen indigenous beyond lat. 53°.

2. Species supposed to be indigenous in the North of England, but not so in Scotland.

3. Species supposed to be indigenous in the Lowlands of Scotland, but not in the Highlands.

4. Species reaching the Highland valleys or plains, but scarcely ascending the hills.

5. Species ascending the Highland hills to some slight elevation, but not exceeding the Oak (*Quercus sessiliflora?*) which probably attains three hundred and fifty yards in favorable situations, failing much earlier on the North-west coasts.

6. Species ascending the Highland hills above the line of the Oak, but not exceeding that of *Corylus Avellana*, which rises to about five hundred yards in favourable situations.

7. Species ascending above the line of the Hasel, but not exceeding that of *Genista Anglica*, which rarely passes six hundred and fifty yards, though sometimes exceeding seven hundred yards. (N. B. *Pteris aquilina* exceeds the Hasel, but fails earlier than the *Genista*.

8. Species surpassing the *Genista*, but not exceeding *Erica Tetralix*, or *cinerea*, the terminal lines of which are usually con-

siderably below eight hundred yards, and nearly on the same level.

9. Species found above the *Ericæ*, but not exceeding *Calluna vulgaris*, which fails at about nine hundred and fifty yards, as an average for latitude 57°, or from seven hundred and fifty yards to one thousand and fifty yards in different situations.

10. Species exceeding the Heather, but not passing *Vaccinium Vitis-Idæa*, which probably attains twelve hundred yards, or upwards, in favourable situations.

11. Species exceeding the *Vitis Idæa*, but not seen above *Vaccinium Myrtillus*, which fails at twelve hundred and fifty to fourteen hundred yards.

12. Species exceeding *Vaccinium Myrtillus* (*Salix herbacea* is the only one). The probable climate of each of these stages may be estimated from the preceding remarks. In the following list the stages are indicated by the numerical figures in the column succeeding the names; and the country in which the North limit of each species is supposed to be found, is named in the second column, in the order or series of Spitzbergen, Port Bowen, Greenland, 72°—76° (East coast, *Sabine's Collection, in Linn. Trans.*), Greenland, 71° (West coast, *Scoresby's Plants, in Wern. Mem.*) N. W. America, 67°—71° (*Botany of Capt. Beechey's Voyage*), Whale Fish Islands, Fox Channel, Greenland (Giesecké), Iceland, Finmark, Nordland, Swedish Lapland, Faroe, Norway, Sweden, Baltic, (*Retz, Prodromus Floræ Scandinaviæ*), Berlin, Holland, Belgium (*Lejeune et Courtois, Flora Belgica*, incomplete), Germany, (*Roth, vol.* 1.) and France.

Clematis Vitalba	1	Holland
Berberis vulgaris	3	Norway
Acer campestre	2	Norway
Euonymus Europæus	3	Norway
Ilex Aquifolium	5	Norway
Rhamnus catharticus	3	Norway
—— *Frangula*	3	S. Lapland
Ulex Europæus	5	Baltic
—— *nanus*	3	France
Genista pilosa	1	Sweden
Genista Anglica	7	Baltic
Cytisus scoparius	7	Sweden
Ononis arvensis	4	Sweden
—— *spinosa*	3	Sweden
Prunus spinosa	5	Sweden
—— *Cerasus*	2	Sweden
—— *Padus*	6	Finmark
Rubus Idæus	7	Finmark
—— *fruticosus, &c.*	6	Norway
Potentilla fruticosa	2	Sweden
Rosa arvensis	3	Baltic
—— *spinosissima*	7	Sweden
—— *canina, &c.*	7	Nordland
Cratægus Oxyacantha	5	Norway
Cotoneaster vulgaris	2	Norway
Pyrus Malus	3	Norway
—— *communis*	3	Sweden
—— *terminalis*	2	Baltic
—— *Aria, &c.*	4	Norway
—— *Aucuparia*	9	N. Cape
Ribes rubrum	2	Finmark
—— *petræum*	5	S. Lapland
—— *nigrum*	2	S. Lapland
—— *alpinum*	3	Nordland
Hedera Helix	4	Sweden
Cornus sanguinea	3	Sweden
Sambucus nigra	5	Norway
Lonicera Periclymemum	7	Norway
Viburnum Lantana	3	Belgium
—— *Opulus*	4	Norway
Viscum album	2	Norway
Vaccinium Myrtillus	11	Lapland
—— *uliginosum*	11	Greenld., 72–76
—— *Vitis Idæa*	10	NW.Am.67–71
—— *Oxycoccos*	8	NW.Am.67–71
Arbutus alpina	10	NW.Am.67–71
—— *Uva Ursi*	8	Fox Channel
Andromeda polifolia	3	NW.Am.67–71
Erica vagans	1	France
—— *ciliaris*	1	France
—— *Tetralix*	8	Norway
—— *cinerea*	8	Faroe
Menziesia cærulea	?	Greenland
Calluna vulgaris	9	Greenland
Azalea procumbens	10	Whale-fish Isles
Ligustrum vulgare	2	Sweden
Fraxinus excelsior	6	Norway

Solanum Dulcamara .	4. Norway
Daphne Laureola	3. Belgium
Hippophae rhamnoides	2. Nordland
Ulmus	6. Norway
Quercus	5. Norway
Corylus Avellana	6. Norway
Betula alba	9. Greenland
——— *nana*	9. NW.Am.67–71
Alnus glutinosa	6. Sweden
Populus tremula	7. Finmark
——— *alba*	3. Sweden ?
——— *canescens*	2. Berlin
——— *nigra*	3. Sweden ?
Salix herbacea	12. Spitzbergen $80\frac{1}{4}$
——— *reticulata*	10. Port Bowen
Myrica Gale	7. Nordland
Pinus sylvestris	8. Finmark
Juniperus communis . .	9. Greenland, 66
Taxus baccata	4. Norway
Empetrum nigrum . . .	10. Greenland, 71
Ruscus aculeatus	3. France

INTRODUCED, OR DOUBTFUL AS NATIVES; BUT PLANTED IN ENGLAND AND SCOTLAND.[1]

Tilia Europæa	Berlin
——— *parvifolia*	Norway ?
——— *grandifolia*	Berlin
Acer Pseudo-platanus . . .	Belgium
Staphylea pinnata	Belgium
Prunus domestica	Sweden ?
——— *insititia*	Baltic
Spiræa salicifolia	Norway
Mespilus Germanica	Berlin
Pyrus domestica	Germany
Tamarix Gallica	France
Ribes Grossularia	Sweden ?
Lonicera Xylosteum	Norway
——— *Caprifolium*	Germany
Daphne Mezereum	Nordland
Buxus sempervirens	Holland ?
Ulmus suberosa, &c.	Norway ?
Fagus sylvatica	Norway
Castanea vulgaris	Holland
Carpinus Betulus	Sweden
Salix	?

[1] It is highly probable that some of the species have been introduced also into the countries named.

The general agreement between the order of cessation on the hills of Britain and towards the Arctic Regions, in a Northwest direction, is sufficiently obvious; but perfect similarity could not be expected, and does not exist. Yet it appears to be not improbable that increased knowledge of actual distribution will bring the coincidences still closer, and explain, if not remove, some of the apparent exceptions. *Salix herbacea* exceeds every other shrub in Britain; it also exceeds every other British shrub in northern latitude. *Vaccinium Myrtillus* and *V. uliginosum* occupy the next stage below; both pass the Arctic Circle, but the progress of the former towards the North-west is arrested sooner than could be expected from its altitude in Britain. *Vaccinium Vitis-Idæa, Arbutus alpina, Azalea procumbens, Salix reticulata, Empetrum nigrum* attain the tenth stage in Scotland; and all these pass the Arctic Circle on the coast of America, or adjacent islands. In the ninth stage we meet with larger species, and belonging to other Natural Orders, *Pyrus Aucuparia, Calluna vulgaris, Betula alba, B. nana,* and *Juniperus communis* (*nana.*) All these occur in Lapland, beyond the Arctic Circle; but in a North-west course from Britain, towards inferior climates, that is, towards the northern coasts of America and its islands, they fall short of the Arctic Circle, with the exception of *Betula nana;* but this shrub is arrested in Scotland much earlier than could have been anticipated from its position on the mountains of Lapland. The same sort of resemblance in terminal lines runs through the stages; and at length in the lowest, or South of England, we find four shrubs terminate, three of which do not reach the Baltic; *Genista pilosa,* however, attains to Sweden, and thus forms an exception on the opposite side to the other shrubby *Leguminosæ,* which rise to higher stages in Britain than what correspond with their latitudinal limits in Europe; but with us *Genista pilosa* is very local, and hence, like *Betula nana,* unadapted for comparison.

ON THE VEGETATION OF ETNA.

(*Continued from p. 52.*)

2. The *woody region* commences very decidedly on Mount Etna at 3,300 feet, extending over Milo, Zaffarana, and the road that leads from Nicolosi to the summit, and stretching to the South and East sides of the mountain to an elevation of 6,000 to 6,200 feet. Ferrara, in his *Descrizione dell' Etna*, states, quite erroneously, that it reaches to 8,000 feet. The girdle that it forms round the mountain is 3,000 feet broad, interrupted only by naked lava streams, and here and there a single field of rye. An interesting statistical account of the woods of Etna has been published by Professor Scuderi of Catania. This region was formerly more extensive, stretching farther down, and the trees were thicker and more beautiful than at present; but while the volcano, whose eruptions might be considered so destructive, has injured them but little, the devastating hand of man has spread the widest ravages. The immense forest, which, in earlier times, extended from the northern declivity of Etna to the walls of Castiglione, was cut down early in the sixteenth century by the Marchese Inveno, to permit of the increase of arable land. About the same period, the beautiful wood of *Plane trees (Platanus orientalis*, or *cuneata)* disappeared, and whereas it had fringed the shores of the Onobola, now only a few scattered shrubby trees remain to attest its original existence. On the road from Francavilla to Fondachelli, I saw Plane trees as high as 2,000. Though now found growing wild in many parts of Italy, this tree was originally brought from the East. Cardinal Bembo, who lived in the end of the fifteenth and beginning of the sixteenth century, says, in his *Dialogus de Etna*, "Nam illis (Platinis) posteaquam in Italiam transvectæ sunt, et quidem ab ipse Sicilia primum, multæ urbes abundavere." Pliny states that the Plane was brought from the East to Sicily, and Dionysius the Elder planted it in his garden at Syracuse. The originally large wood of Mascali has given place to a vineyard, and where once grew the forest of Catania, there now stand the villages of Nicolosi, Trecastagne, Pedara, Mascaleia, Torre del Griso, and Plachi, which are frequently spoken of collectively under the denomination of Villaggi del Bosco. The entire surface of the woody region is estimated by M. Scuderi at 17,734 salme, of which lava occupies one-fourth, arable and meadow land one-seventh, and wood nearly three-fifths, the latter chiefly consisting of Oaks, Beech, and Pines, the number of stems of the former being calculated at 715,863, of Fir or Pine, 841,356, and of Beech, 78,414. The *Chestnut (Castanea Vesca)* does not appear to be wild any where on Etna, but always cultivated. We noticed it on the sides of Mount Zoccolaro at a height of 3,900, and Gemmellaro is said to have traced it so high as 5,100; but this is probably a mistake, arising from an erroneous calculation of the altitude. On the South side of the Alps the *Chestnut trees* reach to 2,500, and on the Pyrenees to 2,800 feet. Etna is celebrated for the great age and colossal dimensions of its Chestnut trees. The noted *Castagno di Cento Cavalli* has a circumference near the root of 180 feet, the *Castagno di Santa Agata* 70, and the *Castagno della Nave* 64 feet. These stems, however, attain no great height, but soon branch off above the ground; and, in regard to the first-mentioned one, it seems probable to me that not one stem, but many shoot from the same root—for there are now five individual trunks separate from each other, and it is a general custom in Sicily, when these trees attain a diameter of about a foot, to cut them down just above the root, when a number of new shoots are thrown out, which shortly become trees again. M. Brunner is of the same opinion, as is stated in his Excursion through the East of Liguria, Elba, Sicily, and Malta. The forests of Etna consist chiefly of *Quercus pubescens* (Willdenow), for such this tree is ascertained to be by my respected instructor, Professor Link, and myself. I am unable to ascertain the name given to this species

by the Italian botanists; but M. Gemmellaro calls it *Quercus Robur*, a tree that also particularly forms the woods of the Apennines, at least in the North of Italy; it differs from our Oaks, at first sight, by its inferior dimensions and less knotted stem. Travellers who climb the mountain by the common road from Nicolosi see scarcely any other tree; it ascends from 3,200 to 5,000, and on the eastern side, in the Val del Leone, to 5,100. *Quercus Cerris* is found in the latter place in tolerable plenty, but not higher than 4,600. *Quercus Ilex*, the *Evergreen Oak*, reaches from the hills of the coast, where it is the most prevailing kind of tree, to the Rocca della Capre, 3,800 feet. The *Beech (Fagus sylvatica)* is not found below 3,000 above the sea in Sicily; its lower boundary in the kingdom of Naples seems to be 2,952: it covers the steep declivities of the Val del Bove, as low trees or shrubs, whence it ascends from the Serra del Salfizio to 6,000, and is particularly plentiful on the East side of the mountain. But there is a tree that is seen at a still greater elevation, and which, being a native of the North of Europe, might not be expected to occur upon Etna at all, namely, the *Birch (Betula alba)*, from which the *B. Etnensis*, Raf. is not distinct. It is not found on the whole line of Apennines, in the kingdom of Naples, except at the most southern end, where it grows in the moist woods of the Aspromonte, where, according to Tenore's reckoning, it does not exceed the elevation of 5,600. The lowest point where we saw the Birch was in the Val del Bove at 4,761, in the Val del Leone and at Monte Arvoltojo at 6,100, where it forms little woods. A species of *Pine (Pinus sylvestris)*, according to Presl and Gemmellaro, but according to Professor Link, *P. Laricio*, is a very stately tree, although I have seen no stems higher than 120 or 130 feet, as M. Tenore did in the Sila Woods of Calabria. We observed the first of these in the Val del Bove at 4,000 feet, and at 4,600 to 5,600 in the Val del Leone. On Monte Arvoltojo this tree reaches to 6,200, but only in little groupes or scattered individuals. The *Aspen (Populus tremula)* grows on the Giammicola at 5,500; the *Holly (Ilex Aquifolium)* in great numbers, and with trunks twelve feet high, accompanies it; while both are scarcely seen higher up than 4,600 feet on the Alps. *Acer villosum*, Presl, and *Monspessulanum*, with the beautiful *Genista Etnensis*, are peculiar to this region. The latter assumes the appearance of a tree about Nicolosi, where it is planted, and where its long, slender, pendent, leafless branches recall to mind the *Casuarinas* of New Holland, when they are not covered with the numerous yellow flowers. In its wild station in the Val del Bove, from 3,900 to 6,000 feet up the mountain, it retains its shrubby mode of growth and does not assume the foreign appearance which I have just described. Among the other shrubs, I would particularly specify the *Spurge-Laurel (Daphne Laureola)*, of which the range is from 2,790 to 4,000 feet, and the *Tree Heath (Erica arborea)*, which grows singly on Etna at 3,800 feet of elevation, whilst on the Canary Islands it ascends to 4,200 feet. Towards the end of the woody region, *Juniperus hemisphærica*, Presl, begins to appear; *Astragalus Siculus* is plentiful at 4,800, and *Berberis vulgaris*, *B. macrocantha (B. Etnensis*, Presl); but this latter plant rather belongs to the upper than the woody region. At the commencement of the woody region our kinds of fruits thrive best; for at a lower elevation the warmth is too great, so that their produce is of very inferior quality. *Cherries* grow well at Portella 2,970 feet, and *Pears* and *Apples* in the district called Tardaria, which may be situated at about 3,400 feet above the level of the sea. Nothing else is cultivated in the woody region but *Rye (Secale cereale)*. This species of grain is said to have been originally introduced by King Victor Amadeus from Germany in the beginning of the last century, an idea which is confirmed by the circumstance of its being called, in addition to the name of *Segala*, *Grano Tedesco*. It is sown in Sep-

tember and reaped in July. We found the lowest fields of *Rye* at Zaffarano, 3,200 feet, the highest at Zoccolaro 5,480. Even in this region there is a remarkable paucity of species of plants. The ground below the trees is thickly clothed with our common *Brake (Pteris aquilina)*, which, in many places, almost banishes every other plant. It is met with from the sea shore, on the North coast, to the height of 5,600 feet, and the Sicilians derive no further benefit from it than burning it down or ploughing it in, thus rendering the ground fit for the Rye without any other manure. Constant accompaniments of the *Pteris*, on Etna, are the pretty *Crocus odorus*, (Bivona), *Crocus longiflorus*, Raf. and *Cyclamen Neapolitanum*, whose beautiful blue and red flowers, late in autumn, charm the eye for a long time after the yellow foliage of the Brake has proclaimed the approach of winter. Still higher up in this region, is *Sternbergia lutea*, which M. Gemmellaro found at 4,300 feet; *Asphodelus luteus* at 5,650, *Potentilla Calabra, Gypsophila rigida, Centaurea cinerea, Achillea ligustica, Tolpis quadriaristata, Apargia hispida* and *autumnalis, Thymus Acinos, Satureja Græca*, with its numerous varieties, which, by many Botanists, are considered as so many proper species: *Paronychia Hispanica*, and *Herniaria microcarpa*. M. Gemmellaro gathered *Croton tinctorium*, even at the elevation of 5,090, at the Grotto della Capre. Besides the plants now enumerated, all those found in the following region are also seen here.

3. The *alpine region*. This extends from 6,200 to 8,950 feet. The *Juniperus hæmisphærica* ascends from the woody region of 4,700 feet as far as 7,100; and it is the same with *Berberis vulgaris (B. Etnensis*, Presl), which we first noted at 5,000 above the sea. But the vegetation of this region acquires its most peculiar feature from the presence of *Astragalus Siculus*, which is here the predominant plant, supplying, to a certain degree, the species of *Rhododendron* which grow on the Alps, and the *Spartium nubigenum* of the Canary Islands. It forms thick semi-hemisphærical tufts, from two to two feet and a half high, and a diameter of four or five feet, with all the appearance of a soft cushion; but woe to the traveller who shall be tempted to recline on it, as he will certainly be grievously wounded by the prickly peduncles of its leaves! This shrub I have already noticed as first seen growing singly at 3,200 and 4,800; but above the woody region it becomes the prevailing plant, and, according to Gemmellaro, is lost at an elevation of 7,940 feet: we saw none of it higher than 7,500. To the same height rises *Tanacetum vulgare*, which is also rather plentiful in the woody region at 3,000 feet. Higher up no more shrubby plants are found; the only species that grow, though sparingly, on the broad and barren top of Etna, are *Saponaria depressa, Cerastium tomentosum, Cardamine thalictroides, Viola gracilis, var. Etnensis* of Gussone, *Galium Etnicum* (Bivona), *Sesleria nitida, Scleranthus marginatus* (Guss.), from 5,000 to 8,000; *Seriola uniflora (Robertia taraxacoides)* as far as 8,600, *Anthemis punctata* and *Rumex scutatus*, 200 feet higher still, at the Cima della Val del Bove. The first of these scarcely occurs lower down than 5,100, and is most plentiful at about 6,000. The *Rumex scutatus* is common on all the lava streams, descending even to the coast and showing no change, in consequence of its lofty place of growth, except that its foliage assumes a greyish hue of green, and a downy surface, which are not sufficient characters to constitute it a species, as is done by Presl, who calls it *Rumex Etnensis*. On the Alps this plant first becomes plentiful at 5,000 feet. At length, the elevation being 8,850, we lose the *Senecio chrysanthemifolius*, which lingers up to the highest point where any vegetation can be traced upon Etna; it varies with entire and divided leaves, which Presl has constituted two species: both of them, however, may be easily traced back to the original type. Here every vestige of vegetation disappears, though, during the sum-

mer months, no snow remains lying on the summit of Etna, and a frightful desert of black fields of lava and ashes commences, where there is no trace of life, and nothing can be seen but the tracks of mules and the bones of these animals, which often excite the curiosity and the enquiries of persons who visit these gloomy and barren heights.

Of the *region of Lichens*, to which Presl assigns an extent of 200 feet above the elevation of 9,000, I could see nothing, and in general the higher parts of Etna are very poor in *Cryptogamia*. *Bryum sanguineum* (?) grows at 7,900 feet, *Grimmia leucophœa* at 7,110, and *Geastrum hygrometricum* (Pers.), with *Nidularia Crucibulum* (Fr.), at 3,000 feet.

After having thus defined the proportions of vegetation upon Etna, I shall proceed to make some observations, by way of comparing this mountain with others, especially with the Alps, which are situated about eight degrees and a half to the northward, and with the Canary Islands, lying nine degrees and a half southward, thus placed at about equal distances from it. What strikes most forcibly at first is the great poverty of species and of individual plants that prevails in the woody and upper regions of Etna, as compared with the immense contrast presented by the varied forms and luxuriant vegetation that clothe the Alps. Still Etna is rich, when viewed in comparison with the scanty produce of the Canary Islands. To the upper region of the Peak of Teneriffe, an elevation of above 5,900 feet, Von Buch assigns only twenty-three species of plants, while, at a height of 6,200 feet, Etna produces about fifty-two species. The reasons for this disparity are, according to Von Buch, the greater distance from the continent and the extreme dryness of Teneriffe. The former is not the case with Etna; but its drought may serve to explain the poverty of its vegetation. The top of the mountain is rarely covered with clouds, (though this may be the case with the Peak); no springs burst from its volcanic sides, the little water that flows down from Etna only comes below where the lava covers the original clayey soil, as at Aci, Paterno, Aderno, &c., and there is no perpetual snow lying on the summit, whose gradual melting in summer would constantly keep the ground in a state of moisture. Rain rarely falls, which is attributable both to Etna being in a southern latitude and to its insolated situation, which forbids its retaining the clouds in their passage, as is the case with entire ranges of mountains. The number of rainy days in Catania is stated, by M. Gemmellaro, as only sixty-three; and in Palermo, where the average is sixty-four, the quantity of rain that annually falls is said to be twenty-two English inches; while, on the southern side of the Alps, the mean quantity is stated at fifty-four, and on the plains of Lombardy thirty-six. Another important reason is the peculiar nature of the soil; for the long series of a thousand years, the original surface of the Alps has been continually exposed to every influence of the weather, and no event of nature has disturbed the gradual formation of fruitful soil and the increase of vegetation upon it: but it is far different with Etna, especially on the higher regions. A fresh flow of lava, a new field of ashes, thickly and speedily cover the scanty vegetation, while another eruption destroys in a moment the slow and gradual production of centuries. Suffice it to say, that fifty-four eruptions have been known to take place, the average being one in every thirty-three years, thus allowing only a similar period as the age of the soil on the highest regions of this mountain.

The following is a tolerably correct list of the plants which grow above the boundary line of trees upon Etna:—

Juniperus hemisphærica, Presl, *Berberis Etnensis*, Presl, (a variety only of *B. vulgaris)*, *Astragalus Siculus*, Bivona, and *Cardamine thalictroides*, the latter is stated by Presl to be peculiar to Etna, as well as *Arenaria aristata*, which is, however, a doubtful species; *A. serpyllifolia*, *Saponaria Etnensis*, *Potentilla argentea*, *Helianthemum glaucum*, and *H. lœvipes*, which latter grows also on the sea shore, *Viola gracilis*, Sibth., *Cerastium tomento-*

sum, Rumex scutatus, Agrostemma Cœli Rosa, Sagina procumbens, Draba verna, Hippocrepis unisiliqua, Onosma echioides, Thymus Acinos, Satureja Græca, Scabiosa montana, Seriola uniflora, Tanacetum vulgare, Anthemis montana, Senecio chrysanthemifolius, Inula montana, Asperula Cynanchica, Galium Ætnicum, Saxifraga trilactylites, very plentiful, and *S. hederacea, Scleranthus annuus, Jasione montana, Orchis sambucina* and *pallens, Ophrys lutea* and *tenthredinifera, Serapias ensifolia, Phalaris alpina, Sesleria nitida, Stipa tortilis, Arundo tenax, Festuca pumila, elatior* and *poæformis,* (the latter is *P. Etnensis* of Presl), *Botrychium Lunaria, Pteris aquilina,* very abundant, and *Asplenium Adiantum nigrum,* common.

From this list we learn, firstly, that the vegetation of Etna has nothing in common with that of the Alps or of the loftiest Apennines, between which again there exists a great affinity: and, secondly, that it is equally different from that of the Canary Islands, to the upper region of which belong nineteen species of plants which are found no where else: while, thirdly, the plants of Etna are all common with the neighbouring continent and the other parts of Sicily, except *Cardamine thalictroides,* which grows in Calabria also; and two, *Betula alba,* and *Juniperus hemisphærica;* all the rest are likewise found in the lower regions of Sicily, only one plant, *Genista Etnensis,* being peculiar to this mountain.

A very striking difference will also be perceived, when you compare the boundaries of the various species of trees upon Etna with those of the Alps, as stated in the following table:—

	South side of the Alps.	Etna.	Difference.
Corn	600	1,900	1,300
Olive	800	2,200	1,400
Vine	2,500	3,300	800
Chestnut	2,500	3,900	1,400
Beech	4,600	6,000	1,400
Boundary of Trees	6,400	6,200	200
Boundary of Snow	8,600	10,448	1,848

At first sight it seems to be a striking anomaly, that whilst the limits of Corn, Olive, Chestnut, and Beech stand in a determined and equal proportion, viz. 1,300 to 1,400 feet higher up on Etna than on the Alps, the woody boundary on this mountain should not rise to a greater elevation also. But this anomaly is more apparent than real, and is not produced by climate; it is solely owing to the circumstance that the upper surface of Etna is so frequently disturbed by volcanic eruptions, showers of ashes, and streams of lava, that no vegetable earth can be formed capable of supporting the growth of trees. A clear proof of this exists in the circumstance that many trees succeed well far higher up in other districts of Sicily, as the *White Poplar* on Timpa dell'Albanello, at an elevation of 7,800 feet. It is easy to see why the Vine, and cultivation of all kinds, does not reach in proportion so far upon Etna as on the Alps. The highest situated place on the south side of the volcano is Nicolosi, 2,184 feet above the sea; it may, therefore, be concluded that cultivated spots will not be seen very far above that point, since labour would be difficult, and the produce, of course, inferior to that which may be procured at a less cost in the immediate neighbourhood of the habitations. The plants of the woody region of Etna are equally different from those of the Alps, as are those of the upper region. You see no species of *Ribes, Vaccinium, Pyrola, Aconitum, Saxifraga,* or *Gentian,* even *Fragaria Vesca* becomes rare, and there is but very little similarity with the vegetation of the neighbouring continent of Italy. Almost every where in Calabria, the mountains, at an elevation of 3,500 to 4,800 feet, are clothed with a beautiful green turf, consisting of various *Grasses, Globularia cordifolia, Astragalus montanus, Alchemilla alpina, Ranunculus brevifolius, &c.* These meadows, as may easily be supposed, are wanting upon Etna, and not one of the above-named plants are to be seen upon it; even the vegetation of the other high Sicilian mountains does not occur upon Etna.

There is some similarity with the vegetation of the Canary Islands, where the

boundary of the woody region is formed by a species of *Pine*, *Pinus Canariensis*, while on Etna it is *P. Laricio*. *Pteris aquilina* is plentiful in both; but grows very sparingly on the Alps. *Erica arborea* grows at a height of 4,200 in the Canary Islands, and of 3,800 on Etna. Instead, however, of the *Oaks* and *Beeches* of Etna, the Peak of Teneriffe exhibits woods of *Laurus nobilis*, *L. fœtens*, and *Indica*. As to the plants of the lower region of Etna, they are much the same as those of the neighbouring continent. Few grow on that part of Etna, for which the climate in the northern provinces of Italy is too cold, though they may be found on the coast of Calabria. *Spartium infestum* (Presl,) takes the place of *S. lanigerum*, which is so common about Naples. This shrub, which is covered in spring with thousands of golden yellow flowers, is still more striking in summer, when it stands destitute of a single leaf, of a grey and mournful green, its numerous twigs tipped with sharp prickles, and contrasting most forcibly with the beautiful frutescent *Solanum Sodomæum*, which is ornamented with large violet-coloured blossoms and golden berries. *Nerium Oleander* and *Ricinus Africanus* are also abundant; the latter, which only lives one year with us, here attains the stature of a shrub and sometimes even of a small tree, the trunk of which cannot be spanned with both hands, and up which the boys climb to gather its fruit. *Chamærops humilis*, the *Palmetto*, so abundant on the South and West coast of Sicily, disappears altogether in the district of Etna. Between the plants of the foot of this mountain and that of the Alps there is no resemblance; a greater similarity exists between it and the Canary Islands, as out of the one hundred and eighty-six plants which Von Buch found on the lower region of Teneriffe, fifty-four are natives of Sicily also. This proportionably large resemblance is owing to the circumstance that many of the plants now found growing wild on the Canary Islands have been introduced from Europe by cultivation.

NOTICE CONCERNING THE LATE MR. DRUMMOND'S COLLECTIONS, MADE CHIEFLY IN THE SOUTHERN AND WESTERN PARTS OF THE UNITED STATES.

(Continued from p. 49.)

406. Liatris *spicata*, Willd.—Covington.

407. Liatris *pycnostachya*, Mich.—St. Louis.

408. Liatris *pilosa*, Willd.—A solitary specimen of this without flower came from New Orleans, in 1833.

409. Liatris *gracilis*, Ph.—This seems to differ from *L. pilosa* only in the glabrous leaves, and Mr. Nuttall inclines to be of the same opinion.

410. Liatris *squarrosa*, Willd.—Covington:—β. floribus longius pedicellatis, involucri squamis appressis vix squarrosis. *L. intermedia*, Lindl.—St. Louis.—This is a very remarkable variety, but I do not think it can be separated from the *L. squarrosa*.

411. Liatris *elegans*, Willd.—Jacksonville. St. Louis.—Flowers smaller than in the following species.

412. Liatris *scariosa*, Willd.—St. Louis.—I scarcely see how *L. sphæroidea* is distinguishable from this.

413. Liatris *squamosa*, Nutt.—Sp. (in Pl. of Acad. Phil.)—Caule erecto simplicissimo pubescente, foliis lineari-subulatis glabriusculis punctatis glaucis caulinis numerosis brevibus arcte appressis, corymbo parvo paucifloro, pedicelli bracteis subulatis appressis, involucri squamis ovato-lanceolatis imbricatis pubescenti-tomentosis.—*L. appressa*, *Torrey in Herb. nostr.*, Covington.—Jacksonville. N. Orleans, 1833.—β. floribus racemosis. Jacksonville.—The whole plant has, in its dried state, a peculiarly glaucous hue. Stem one foot and a half to two feet high, erect, very straight, and quite simple. Lowermost and radical leaves 4—5 inches long, more or less spreading; the rest on the stem one-half or three-quarters of an inch long, closely appressed; all of them impressed with dots and involute at the margin. In every specimen, but one, the inflorescence is decidedly a simple corymb of from three to five moderately-sized flowers. The upper part of the stem and pedicels are very downy. In the var. β. there is a distinct raceme of thirteen or fourteen flowers. The root does not appear to be tuberous, but is perennial, if I may judge from the fibrous remains of old leaves. Dr. Torrey's spe-

mens, and others I have received from Mr. Greene, were gathered in Alabama.

414. Liatris *odoratissima,* Willd.—Covington.

415. Elephantopus *Carolinianus,* Willd. —St. Louis.

416. Elephantopus *nudicaulis,* Ell.—*E. Carolinianus,* var. simplex, Nutt.—Jacksonville.—β. *major;* foliis tomentoso-hirsutis. Covington.—This species has, indeed, a very different appearance from *E. Carolinianus,* and has been characterized as distinct and under the same name by M. Poiret in Lam. Encycl. as well as by Mr. Elliott. It is precisely the same as the East Indian *E. scaber,* Wall. Cat. C. 89, C. 89 b, and C. 89 g.

417. Eupatorium *hyssopifolium,* Walt.—Jacksonville. Covington.—Some of the specimens, from their more obscurely toothed leaves, seem to combine the *E. linearifolium* with the *E. hyssopifolium.*

418. Eupatorium *altissimum,* L.—*Kuhnia glutinosa, Ell. (fide specim in herb. nostr.)*—St. Louis.—What I take for this plant is identical with Mr. Elliott's *Kuhnia glutinosa,* in which I find the pappus scabrous, not "beautifully feathery."

419. Eupatorium *ambiguum,* n. sp.? pubescens superne valde ramosum, foliis oppositis ternisve ovato-lanceolatis in petiolum breviusculum attenuatis inæqualiter serratis, floribus corymboso-paniculatis parvis subglobosis, involucri squamis brevibus obtusis pubescentibus punctato-glandulosis, flosculis 8—10.—Jacksonville. Covington.—I cannot refer this to any described species, nor have I received it from any American Botanist. It is from two to three feet high; leaves one and a half to two inches long, petiolate; the numerous flowering branches at the top form a large spreading panicle of small apparently white flowers.

420. Eupatorium *album,* L.—Covington.

421. Eupatorium *rotundifolium,* L.—Covington.

422. Eupatorium *ceanothifolium?* Mich. —St. Louis.

423. Eupatorium *verbenæfolium,* Mx.—Covington.—Probably the same as *E. teucriifolium,* Willd.

424. Eupatorium *ageratoides,* L.—St. Louis.

425. Eupatorium *aromaticum,* L.—Jacksonville.—The leaves are of a more rigid texture and on shorter petioles than in the preceding species.

426. Eupatorium *perfoliatum,* L.—Jacksonville. St. Louis.

427. Eupatorium *purpureum,* L.—Covington.

428. Cælestina *cærulea,* Cass.—St. Louis. Jacksonville. Covington.

429. Mikania *scandens,* Willd.—Jacksonville.—The *Mikania pubescens* appears to be only a very slight var. of *M. scandens.*

430. Kuhnia *eupatorioides,* L.—Jacksonville. St. Louis.—The leaves certainly vary in breadth and pubescence in this species, and I doubt extremely how far the *K. Critonia* is distinct from it.

431. Chrysocoma *nudata,* Mx.—Covington. Jacksonville.

432. Spilanthes *Acmella,* L.—N. Orleans, 1833.

433. Cacalia *tuberosa,* Nutt.—Covington.

434. Marshallia *latifolia,* Ph.—St. Louis.

435. Marshallia *angustifolia,* Ph.—Jacksonville.

436. Baccharis *halimifolia,* L.—N. Orl. (*n.* 169). Jacksonville.

437. Conyza *camphorata,* Ph.—Covington. N. Orl.—*Conyza angustifolia,* Nutt. *(in Pl. of Herb. Acad. Phil.)*—N. Orl. 1833.

438. Conyza *bifrons,* L.—β. foliis angustioribus basi minus cordatis non amplexicaulibus..—Covington.—The leaves are longer, narrower, and much less cordate at the base, than any specimens I have seen from the American Botanists.

439. Gnaphalium *polycephalum,* Mx.—Jacksonville. St. Louis.

440. Gnaphalium *Americanum,* L.—N. Orl. (*n.* 162).—β. foliis angustioribus, caule valde ramoso.—N. Orl. (*n.* 163).

441. Gnaphalium *purpureum,* L.—New Orl. (*n.* 164).

442. Gnaphalium *plantagineum,* L.—N. Orl. 1833. Pennsylvania.

443. Erigeron *Canadensis,* L.—Covington. St. Louis.

444. Erigeron *divaricatus,* Mx.—N. Orl. (*n.* 174).—*E. pusillus,* Nutt. is very near to some states of this.

445. Erigeron *strigosus,* Willd.—N. Orl. (*n.* 172).

446. Erigeron *quercifolius,* L.—N. Orl. (*n.* 170).

447. Erigeron *Philadelphicus,* L.—*E. purpureus,* Ait.—N. Orl. (*n.* 171). Ohio.

448. Erigeron *bellidifolius,* Willd.—*E. pulchellus,* Mich.—Pennsylvania. N. Orl. (*n.* 173).—Perhaps a variety of *E. purpureus,* with smaller leaves on the stem.

449. Erigeron *nudicaulis,* Mich.—New Orl. (*n.* 174).

(To be continued.)

450. Diplopappus *Marianus*, Cass. (Chrysopsis, *Nutt.*)—N. Orl. (*n.* 185).

451. Diplopappus *trichophyllus?* (Chrysopsis, *Nutt.*)—Covington. Jacksonville.—This is a much taller, more erect plant, with narrower leaves than *D. Marianus.*

452. Diplopappus *sericeus*, (Chrysopsis, *Pers.*)—N. Orl. (*n.* 184). Jacksonville.

453. Diplopappus *villosus*, (Chrysopsis, *Nutt.*)—St. Louis.

454. Diplopappus? (Chrysopsis) *divaricatus*, Nutt. — N. Orl. (*n.* 519). — This is, as Mr. Nuttall observes, widely different in habit from the other species of the genus, and will probably constitute a distinct genus. The flowers are small; the involucre almost cylindrical; panicle large, spreading.

455. Boltonia *asteroides*, L'Hérit.—St. Louis.

456. Boltonia *diffusa*, Ell.—Covington. Jacksonville.

457. Euthamia *tenuifolia*, Nutt. (Brachyris? *Less.*)—Jacksonville.

458. Solidago *scabra*, Willd.—Jacksonville.

459. Solidago *nemoralis*, Ait.—St. Louis.

460. Solidago *serotina*, Ait.—St. Louis.

461. Solidago *tortifolia*, Ell.—Jacksonville.

462. Solidago *ulmifolia?* Ell. (non Willd. or Nutt.)—St. Louis.

463. Solidago *ulmifolia*, Nutt. (fide Nutt. in Boott Herb. non Ell.)—St. Louis.

464. Solidago *axillaris*, Ph.—Louisiana.

465. Solidago *Boottii*, n. sp.; caule erecto angulato glabriusculo superne ramoso folioso, foliis ovato-lanceolatis acuminatis integerrimis basi in petiolum alatum attenuatis marginibus scabris, racemis paniculatis terminalibus, floribus secundis, pedicellis bracteatis pedunculisque pubescentibus, involucris glabris.—Louisiana.—This is considered a new species by my valued friend Dr. Boott. It seems to be a tall growing plant, of slender, graceful habit. Leaves one to two inches long, including the tapering base, which resembles a winged petiole. Flowers of a moderate size, not much crowded.

466. Solidago *Mexicana*, L.—β. floribus lato-corymbosis.—St. Louis.

467. Solidago *rigida*, L.—St. Louis.

468. Solidago *lanceolata*, L.—St. Louis. N. Orl. 1833.

469. Solidago *tenuifolia*, (Euthamia), Nutt.—Jacksonville. N. Orl.

470. Aster *Novæ Angliæ*, L.—St. Louis.

471. Aster *oblongifolius*, Nutt.—St. Louis.

472. Aster *patens*, Ait.—St. Louis.—β. *gracilis*, ramis longissimis, foliis parvis. Jacksonville.—Mr. Nuttall considers this distinct.—*Boott.*

473. Aster *argenteus*, Mich.—*A. sericeus*, *Vent. New.*—St. Louis.

474. Aster *Drummondii* (*Lindl.*) n. sp.; "totus incanus, foliis cordato-ovatis crenato-serratis supremis sessilibus, ramulorum lineari-oblongis acuminatis, caule ramisque racemoso-thyrsoideis strictis, involucri foliolis subulatis." *Lindl. MSS.*—"Inter *A. paniculatum* et *undulatum* quasi medius, canitie facillime distinguendus. Radii verosimiliter cyanei."—St. Louis.

475. Aster *æstivus*, Ait.—N. Orl.

476. Aster *subasper*, (Lindl.) n. sp.; "foliis angusto-lanceolatis subsessilibus acuminatis uniformibus supra per totam superficiem scabris, superioribus gradatim minoribus, caule inferne glabro superne pubescenti racemoso-composito, ramis secundifloris, involucri hemisphærici foliolis linearibus acutis disco conspicuo brevioribus exterioribus laxis." *Lindl. MSS.*—*A. obliquo* distinctissimus foliis latioribus uniformibus semper ut videtur integerrimis capitulisque majoribus.—*A. tenuifolium* etiam mentitur. *Lindl.*—St. Louis.

477. Aster *rubricaulis?* Lam.—N. Orl. 1833.

478. Aster *attenuatus*, (Lindl.) n. sp.; foliis lineari-lanceolatis acuminatis lævissimis margine serrulato-scabris ramulorum minimis linearibus acuminatissimis erectis, caule glabro simplicissimo gracili apice irregulariter racemoso, ramis brevibus erectis submonocephalis, involucri foliolis exterioribus acuminatis subsquarrosis. *Lindl. MSS.*—"Species ab omnibus huc usque notis procul dubio distincta, fastigiis caulis et ramulorum, foliis sensim diminutis necnon inter species conterminas involucro subsquarroso bene circumscripta. *Folia* etiam glaberrima, quasi lævigata, excepto margine serrulato-scabro, notam vix fallacem præbent."—Jacksonville.

479. Aster *glabellus*, Nees.—St. Louis. "An *A. ericoides*." *Boott.*

480. Aster *coridifolius*, Nees.—Jacksonville.

481. Aster *adnatus*, Nutt. (in Pl. of Herb. Acad. Phil.), scaberrimus, cauli erecto gracili superne laxi paniculatim ramoso, foliis parvis oblongis acutis erectis disco per totam fere longitudinem cauli adnato apice solummodo libero! floribus solitariis in apice ramulorum, involucri squamis linearibus imbricatis apicibus acutissimis herbaceis subreflexis.—N. Orl.

—This most remarkable species of *Aster* is everywhere very scabrous. The stems 1—2 feet high, clothed with closely placed, almost imbricated, erect, small leaves, the longest of them not half an inch long, and gradually becoming smaller upwards: the peculiarity of these leaves is, that the disk for nearly the whole length is confluent with the stem, the apex alone being free. In general habit, perhaps, it comes nearest to *A. coridifolius.* I have received the same plant, without a name, from Dr. Torrey, gathered in Alabama.

482. Aster *miser*, L.—St. Louis.

483. Aster *concolor*, L.—N. Orl. Jacksonville.

484. Aster *multiflorus*, β. *ciliatus*. Nees. —St. Louis.

485. Aster *azureus*, (Lindl.) n. sp.; foliis lanceolatis utrinque acuminatis scaberrimis subserratis superioribus integris, ramorum subulatis, caule racemoso-composito virgato, ramulis elongatis monocephalis, involucri hemisphærici foliolis imbricatis apice tantum patulis. *Lindl.* —"Est quasi hybridus inter *A. rubricaulem* et *A. multiflorum.*"—St. Louis.

486. Aster *turbinellus*, (Lindl.) n. sp.; foliis oblongo-lanceolatis subamplexicaulibus integerrimis, ramorum oblongis obtusis sensim in subulatis decrescentibus, caule subsimpliciter ramoso virgato, ramis elongatis filiformibus subunifloris, involucri turbinati foliolis linearibus obtusiusculis apice herbaceis. *Lindl. MSS.*—"Species valde distincta, *purpurato* quamvis proxima, diversissima foliorum forma, involucro magis turbinato, ramisque filiformibus, nec rigidis strictis."

487. Aster *mutabilis*. Ait.—St. Louis.

488. Döllingeria *cornifolia*, Nees.—Jacksonville.

489. Diplostephium *linariifolium*, Nees.—Jacksonville.

490. Seriocarpus *solidaginoides*, Nees.—Covington.

491. Stenactis *heterophylla*, Nees.—St. Louis.

492. Boebera *chrysanthemoides*, Willd. —*B. glandulosa, Nutt.*—St. Louis.

493. Senecio *hieraciifolius*, Pursh.—N. Orl. (*n.* 175), 1833.

494. Senecio *lobatus*. Pers.—N. Orl. (*n.* 176).—M. Tainturier also finds the same plant in Louisiana.

495. Eclipta *brachypoda*, Mich.—N. Orl. (*n.* 168).

496. Verbesina *Virginica*, L.—Jacksonville. N. Orl.

497. Achillæa *Millefolium*, L.—Covington.

498. Heliopsis *lævis*, Pers.—St. Louis.—*var.* minor; floribus parvis, radiis paucis. —Covington. N. Orl. 1833.—The specimens of β. are very small: those from N. Orl. scarcely more than a foot high, and bearing only a single small flower.

499. Helenium *quadridentatum*, Mich.—N. Orl. (*n.* 179).

500. Helenium *tenuifolium*, (Nutt.) ramosissimum, foliis numerosissimis angusto-linearibus, pappi foliolis valde acuminatis.—Nutt. in Journ. Acad. Nat. Sc. Phil. v. 7. p. 66.—N. Orl. (*n.* 177). Covington.—This is a most distinct species, but variable in size, from a span to a foot and a half in height.

501. Leptopoda *Helenium*, Nutt.—N. Orl. (*n.* 178).

502. Balduina *uniflora*, Nutt.—Covington.

503. Galardia *bicolor*, Lam.—Covington.

504. Helianthus *angustifolius*, L.—Jacksonville. Covington.

505. Helianthus *atro-rubens*, L.—Jacksonville.—*var.* foliis acutioribus. St. Louis.—To this the following species is very nearly allied.—There is, besides, a species of *Helianthus* from Covington, which I cannot satisfactorily refer to any described one; with much branched stems, scarcely scabrous, alternate (in the flowering branches), ovato-acuminate, shortly petiolated, rather rigid leaves, three-nerved at the base, very pale beneath. Scale of the involucre lanceolate, pubescenti-scabrous, patent, almost squarrose. Flowers rather small.

506. Helianthus *heterophyllus*; (Nutt.) "caule unifloro gracili, foliis piloso-hirsutis plerisque oppositis, radicalibus oblongo-ellipticis, superioribus lineari-lanceolatis, omnibus integris, squamis calycinis lanceolatis acuminatis."—Nutt. in Journ. of Acad. of Nat. Sc. Phil. v. 7. p. 74.—β. foliis radicalibus longioribus angustioribusque. St. Louis.—Covington. This only differs from the "Alabama" specimens of Nuttall, in the greater length of the radical leaves, which, however, are much narrower in the Covington plant than in that from St. Louis: all are three-nerved. The latter is destitute of any.

507. Helianthus *pubescens*, Ell., vix alior. —Jacksonville. St. Louis.

508. Helianthus *tracheliifolius*, Willd. and *var.* fol. lanceolatis.—Covington.

509. Helianthus *giganteus*, L.—St. Louis.

510. Helianthus *mollis*, Ell. (an alior?)—St. Louis.

511. Helianthus *divaricatus*, L.—St. Louis.

512. Chrysogonum *Virginianum*, L.—Alleghanies.

513. Polymnia *Uvedalia*, L.—St. Louis.

514. Polymnia *Canadensis*, L.—St. Louis.

515. Silphium *scaberrimum*, Ell.—St. Louis.

516. Silphium *terebinthaceum*, L.—St. Louis.

517. Silphium *laciniatum*, L.—*S. pinnatifidum*, et *S. gummiferum*, Ell.—St. Louis.—The lower leaves may be said to be bipinnatifid. In this species, (which is a gum-bearing one) and in *S. terebinthaceum*, the leaves and whole plant change to a reddish brown colour.

518. Silphium *asperrimum*, n. sp.; caule elato hispido, foliis alternis oblongo-ovatis sessilibus acutis utrinque hispido-scabris margine scaberrimis integerrimis, floribus subpaniculatis, pedunculis foliosis, involucri foliolis oblongis foliaceis squarrosis scabris, acheniis obovatis planis bidentatis.—Covington.—This is a singularly harsh and hispid plant, the stem, in particular, (besides being clothed with a short and harsh down) is furnished with numerous, spreading, rigid hairs or bristles. The leaves are all alternate and sessile, 3—4 inches long, nearly erect, marked with a close but very evident network, quite entire.

519. Silphium *Asteriscus*, L.—N. Orl. 1833. Here the leaves are alternate, all of them (except the radical ones) sessile, remotely and coarsely serrated, very rough; the stem exceedingly hispid.

520. Silphium *betonicifolium*, n. sp.; subprocumbens, caule pubescenti-hirsuto, foliis alternis cordato-ovatis omnibus petiolatis obtusis lævibus subtus ad nervos pubescentibus grosse duplicato-crenatis, acheniis muticis.—N. Orl. 1833.—This, I think, never can be a variety of *S. Asteriscus;* the leaves are cordato-ovate, rarely and only the upper ones approaching to oblong, of an almost membranous texture, clothed with scattered short hairs, more copious and stellated on the under-side, the margin so deeply and coarsely crenated, as almost to be sinuated, in which respect it differs remarkably from the *S. pumilum*, Mich.: all of them on petioles nearly an inch long. The stem is softly pubescent with short hairs. Florets of the ray 7—8, bright-yellow. Achenia broadly obovate, margined, entire at the summit. The scales of the receptacle fold round the abortive germens, which are linear, cup-shaped at the top, after the corolla has fallen away. The peduncles are clothed with beautifully jointed, purplish hairs.

521. Actinomeris *squarrosa*, Nutt.—*Coreopsis alternifolia*, L.—St. Louis.—Florets of the ray 10—12; often wanting.

522. Actinomeris *helianthoides*, Nutt.—St. Louis.—This has the leaves much narrower than in the *A. squarrosa;* but the florets of the ray, in our specimen, are wanting.

523. Coreopsis *lanceolata*.—Covington.

524. Coreopsis *crassifolia*, Ait.—N. Orl. (n. 182).

525. Coreopsis *auriculata*, L.—N. Orl. 1833, (very few specimens). Covington? —Larger leaves more divided.

526. Coreopsis *tripteris*, L.—St. Louis.

527. Coreopsis *senifolia*, Mx.—St. Louis.

528. Coreopsis *verticillata*, L.—Covington.

529. Coreopsis *trichosperma*, Mx.—St. Louis. Jacksonville. Covington.

530. Coreopsis *tinctoria*, Nutt.—N. Orl. 1833.

531. Rudbeckia *triloba*, L.—(with cauline leaves only.) *Helianthus sparsifolius*, Ell.—St. Louis.

532. Rudbeckia *apetala*, Torrey in Nutt. Journ. of Acad. of Sc. Philad. v. 7. p. 77.—Covington. Jacksonville.—Is it not the *R. Radula*, Ph.?

533. Rudbeckia *purpurea*, L.—St. Louis.

534. Rudbeckia *hirta*, L.—N. Orl. (*n.* 183).—*β. major;* magisque hispida.—St. Louis.—This is the *R. fulgida* of Torr. in Herb. nostr.; but not of Aiton. I am not well able to distinguish that species from *hirta*.

535. Rudbeckia *pinnata*, Vent.—St. Louis.

536. Dracopus *amplexicaulis*, Cass. Less.—Bot. Mag. ined.—*Rudbeckia ampl.* L.—*R. perfoliata*, Cav.—N. Orl. (*n.* 182).—A most distinct and well marked plant, everywhere glabrous, except at the margin of the leaves.

537. Bidens *bipinnata*, L.—St. Louis.

538. Bidens *frondosa*, L.—*α. major;* involucri foliolis brevioribus.—St. Louis.—*β. minor;* involucris longioribus.—Jacksonville.—St. Louis.

539. Bidens *minima*, L.—N. Orl. 1833.

540. Bidens *comata*, L.—St. Louis.

541. Bidens *chrysanthemoides*, Mx.—St. Louis.

542. Parthenium *Hysterophorus*, L.—N. Orl. (*n.* 165.)

543. Ambrosia *trifida*, L.—St. Louis.

544. Ambrosia *elatior*, L.—N. Orl. 1833.

545. Ambrosia *Pitcheri*, Torr. MSS.; hirsuto-scabra, foliis ovato-acuminatis subinciso-serratis, racemis paniculatis,

capitulis longe bracteatis.—α. bracteis ovato-acuminatis valde ciliatis.—β. bracteis lanceolatis vix ciliatis.—β. N. Orl. 1833.—A most distinct plant, differing from the original *A. Pitcheri* (from the Red River) of Dr. Torrey in my Herbarium, in the somewhat narrower leaves, and much narrower, but equally long and conspicuous bracteas, which are moreover less distinctly ciliated. The presence of these large bracteas readily distinguishes the species.

546. Iva *frutescens*, L.—Covington.

547. Apogon *humilis*, Ell.—N. Orl. (*n.* 159).

548. Borkhausia *Caroliniana*, Nutt.—N. Orl. (*n.* 156).—β. *ramosa;* foliis plerisque profunde pinnatifidis. — N. Orl. (*n.* 157).

549. Sonchus *leucophæus*, Willd. — N. Orl. (*n.* 155). Jacksonville. Covington. St. Louis.

550. Lactuca *elongata*, Michl.—Ohio.

551. Lactuca *sagittifolia*, Ell.—*var.* foliis dentatis.—St. Louis.

552. Lactuca *graminifolia*, Mx. — Covington. St. Louis.

553. Krigia *Caroliniana*, Nutt.—N. Orl. (*n.* 158).

554. Krigia *Virginica*, Willd.—Pennsylvania.

555. Hieracium *Gronovii*, L.—Covington. β. major.—Covington.

556. Chaptalia *integrifolia*, Mich. — N. Orl. (*n.* 167).

LOBELIACEÆ. *Br.*

557. Lobelia *paludosa*, Nutt. Pursh.—*L. crassiuscula*, Ell. (non Mich.)—N. Orl. (*n.* 187). Covington. — A remarkable plant, with very long, narrow, radical leaves, sometimes a foot in length, fistulose, and a succulent stem. I think that Elliott, and perhaps Michaux, have included this and the following species under *L. crassiuscula.*

558. Lobelia *crassiuscula*, Mich. — *L. glandulosa*, Walt. — Jacksonville. — A very interesting species, readily distinguished by the copious toothing of the leaves, and the deeply-toothed, almost incised margins of the calycine segments. I possess the same species from Alabama. My specimens, however, are perfectly glabrous in the stem and leaves. The flowers have the closest affinity with the preceding species, and in one specimen that I have of *L. paludosa*, from Dr. Torrey, under the name of *glandulosa*, the upper leaves are similarly glanduloso-dentate, which almost leads me to think that the different appearance of the two plants may arise from the one (*L. crassiuscula*) growing in dry, the other (*L. paludosa*) in very wet situations.

559. Lobelia *puberula*, Mich.—*var. subglabra*, Hook, Bot. Mag. t. 3292.—Jacksonville.

560. Lobelia *Claytoniana*, Mich. — St. Louis.

561. Lobelia *inflata*, L. *var.* valde hirsuta.—St. Louis.—I have the same hairy variety from Georgia, sent by Dr. Torrey, who observes that, in that State, it is rarely found about New York. It is the true *L. inflata* of Pursh.

562. Lobelia *siphilitica*, L.—St. Louis.—β. *minor;* foliis sesquiuncialibus obtusis subintegerrimis.—St. Louis.

563. Lobelia *cardinalis*, L.—Covington. St. Louis.

CAMPANULACEÆ. *Juss.*

564. Campanula *Americana*, L.—*C. acuminata.* Mich.—St. Louis.

565. Specularia *perfoliata*, D C.—N. Orl. (*n.* 188).—β. foliis angustioribus vix amplexantibus.—N. Orl.

ERICINEÆ. *Juss.*

566. Clethra *alnifolia*, L.—N. Orl. 1833.

567. Cyrilla *racemiflora*, Walt.—N. Orl. (*n.* 202).

568. Andromeda *nitida*, Walt.—N. Orl. (*n.* 192).

569. Andromeda *racemosa*, Mich.—Jacksonville (in bud only). Covington (in ripe fr.). Pennsylvania (fl. and old fr.). N. Orl. (*n.* 191).

570. Andromeda *Mariana*, L.—Pennsylvania (cult.?).

371. Andromeda *arborea*, L.—Covington.

372. Andromeda *paniculata*, Willd.—N. Orl. (*n.* 193).

573. Andromeda *pulverulenta*, Bart. — Pennsylvania (cult.).

574. Menziesia *ferruginea*, L. — Alleghanies.

RHODORACEÆ.

575. Kalmia *latifolia*, L.—Alleghanies. Pennsylvania.

576. Azalea *nudiflora* L.—Alleghanies.

577. Azalea *viscosa*, L.—N. Orl. (*n.* 198). Covington, *var.* hispida.—*A. hispida*, Ph.—Covington.

VACCINIEÆ.

578. Vaccinium *stamineum*, L. — Pennsylvania. N. Orl. (*n.* 195).

579. Vaccinium *diffusum*, Ait.—*V. arboreum*, Mich.—N. Orl. (*n*. 196).

580. Vaccinium *frondosum*, L.—N. Orl. (*n*. 199).

581. Vaccinium *resinosum*, Ait.—Pennsylvania.

582. Vaccinium *corymbosum*, L.—Pennsylvania. N. Orl. (*n*. 197) in fr.

583. Vaccinium *Pennsylvanicum*, Lam. —Pennsylvania.

584. Vaccinium *amœnum*, Ait.—N. Orl. 1833.—This comes very near to *V. Pennsylvanicum* and *V. corymbosum;* but the flowers are larger, more cylindrical, and narrower upwards.

585. Vaccinium *virgatum*, L.—N. Orl. (*n*. 200).

586. Vaccinium *dumosum*, Pl.—N. Orl. (*n*. 198). Covington.

587. Vaccinium *Myrsinites*, Mx. — N. Orl. (*n*. 206).

PYROLACEÆ. *Nutt.*

588. Monotropa *uniflora*, L.—St. Louis.

589. Monotropa *lanuginosa*, Mx. — N. Orl. 1833.

STYRACEÆ.

590. Styrax *glabrum*, Cav.—N. Orl. (*n*. 205).

591. Symplocos *tinctoria*, L. — N. Orl. (*n*. 203).

592. Halesia *diptera*, Cav. — N. Orl. (*n*. 206).

SAPOTEÆ. *Juss.*

593. Bumelia *lanuginosa*, Mx. —N. Orl. (*n*. 207) with leaves only, which are clothed beneath with ferruginous wool; probably only a *var*. of the following.

594. Bumelia *tenax*, L. — *Sideroxylon chrysophylloides*. Mich. — N. Orl. (*n*. 207 bis.)

EBENACEÆ. *Vent.*

595. Diospyros *Virginica*, L.—α. foliis minoribus acuminatis. N. Orl. (*n*. 204). —β. foliis majoribus acutis. N. Orl. (*n*. 204 bis.)—γ. foliis 4—5 uncialibus obtusis. St. Louis (in leaf only.)

JASMINEÆ. *Juss.*

596. Olea *Americana*, L.—N. Orl. 1833. (Flowers scarcely expanded.)

597. Chionanthus *Virginica*, Walt.—N. Orl. (*n*. 212).

598. Fraxinus *epiptera*, Mx. — N. Orl. (*n*. 210).

599. Fraxinus *platycarpa*, Mx.—N. Orl. (*n*. 208) foliis angustioribus.

600. Fraxinus *pubescens*, Walt.—N. Orl. (*n*. 209) leaf only.

601. Fraxinus *Americana*, Willd. — N. Orl. 1833. St. Louis.

ASCLEPIADEÆ. *Br.*

602. Asclepias *Syriaca*, L.—Umbels terminal only. St. Louis.—This *var*. is what I have received from Boston, as the *A. Syriaca;* but it has not the nectaries so much spreading as *Dillenius's* figure in *Hort. Elth. t.* 28, *f.* 31. That plant, indeed, seems a very dubious one.

603. Asclepias *phytolaccoides*, Lyon.—St. Louis. Leaves narrower and more acuminated than my Kentucky specimens, but in other respects the same.

604. Asclepias *incarnata*, L. — N. Orl. (*n*. 218). St. Louis.

605. Asclepias *variegata*, L. — N. Orl. (*n*. 216).

606. Asclepias *paupercula*, Mich. — N. Orl. (*n*. 207).

607. Asclepias *quadrifolia*, Jacq. — St. Louis.

608. Asclepias *viridiflora*, Pursh.—Polyotus, *Nutt.* 1834. — var. *pubescenti-tomentosa;* foliis oblongo-obovatis obtusissimis cum mucrone, superioribus multo minoribus angustioribusque.—Covington.

609. Asclepias *verticillata*, L.—St. Louis.

610. Asclepias *tuberosa*, L. — St. Louis. Covington.

611. Gomphocarpus *longifolius*, Spr. — St. Louis. N. Orl. (*n*. 219).

612. Apocynum *pubescens*, Br.—Ohio.

613. Apocynum *cannabinum*, L. — St. Louis.

614. Apocynum *hypericifolium*, Ait. — Ohio.

615. Gelseminium *sempervirens*, Ell. — N. Orl. (*n*. 214) 1833.—β. foliis latioribus. N. Orl. (*n*. 215).

616. Parsonsia *difformis*, Br. — N. Orl. (*n*. 213).

617. Enslenia *albida*, Nutt.—St. Louis.

618. Gonolobus *discolor*, Br. — *Cynanchum discolor. Sims in Bot. Mag. t.* 1273.— *Gonolobus hirsutus. Short. Cat. Kentucky, Pl.* — Pennsylvania.—This species is correctly figured in the Bot. Magazine, under the specific name here adopted. It is well distinguished by the long peduncles, and the segments of the corolla, which are longer and narrower than any species of the genus I have yet seen. *G. Carolinensis* has oval segments to the corolla.

(To be continued.)

CONTRIBUTIONS TOWARDS A FLORA OF SOUTH AMERICA AND THE ISLANDS OF THE PACIFIC.

By W. J. Hooker, LL.D. and G. A. W. Arnott, Esq. A.M. F.R.S.E.

(Continued from page 38.)

Trib. III.—Mutisiaceæ.—*Cass. Less. l. c. p.* 92.

Sub-trib. I.—Facelideæ, *Less. l. c. p.* 123.

791. (1.) Facelis *apiculata*, Cass.—*Less. in Linnæa*, 5. *p.* 364.—Leptalea apiculata, *Don in litt. cum descr.* — Gnaphalium retusum, *Lam.*—Elichrysum retusum, *Spr.*—Valparaiso, *Cuming* (*n.* 497); *Bridges* (*n.* 227).—Buenos Ayres, *Tweedie.*—The achenia are clothed with long, adpressed, white, silky hairs, the extremities of which appear to have been mistaken by Mr. Don for a very short "setaceo-pilose" external pappus: the pappus is however in a simple series and plumose.

792. (1). Lucilia *acutifolia*, Cass.—*Less. in Linnæa*, 6. *p.* 382.—Serratula acutifolia, *Poir.* Gnaphalium Commersonii, *Spr.* — Elichrysum Montevidense, *Spr.* —Sandy coasts of Parana; sandy places of the Banda Oriental; dry banks of Porta Legre; and on the tops of the mountains of Rio Jacquety and Montevideo; *Tweedie.*

793. (2.) Lucilia *Chilensis* (Hook *et* Arn.) caule ramoso, foliis spathulato-oblongis mucronatis utrinque villoso-tomentosis, tomento niveo opaco, capitulo pauci-(15?) floro, involucri foliolis intimis acuminatis.—Valparaiso, *Cuming* (*n.* 342). —Cordillera? of Chili, *Cuming* (*n.* 343). — Unfortunately, our specimens only present the old capitula, from which the florets have fallen, but the number of the latter may be nearly determined from the rachis. Although we cannot ascertain the structure of the pappus, or the number and structure of the radical florets, there can be no doubt as to the genus.

794. (3.) Lucilia *argentea*, (Hook. *et* Arn.); caulibus simplicibus oligocephalis, foliis lanceolato-oblongis recurvato-mucronatis utrinque æqualiter tomento brevissimo splendenti argenteo instructis, involucri foliolis intimis acuminatis, capitulo sub 30-floro, pappo rariter plumoso.—Dry sandy pastures near Montevideo and Maldonado, *Tweedie.*—This differs from *L. acutifolia*, γ, of Lessing by the pappus and inner leaflets of the involucre; from *L. nitens* by the pappus and tomentum of the leaves being equal on both sides; from *L. gnaphalodes*, by its much larger size (stems in our plant 4—10 inches high) and capitula with more numerous florets.

Sub-trib. II.—Lerieæ, *Less. l. c. p.* 120.

795. (1.) Chevreulia *filiformis*, (Hook. *et* Arn.); caulibus gracillimis, foliis supra viridibus acuminatis oppositis per caules subequidistantibus, ramis floriferis brevibus usque ad capitulum foliosis.—St. Catherine's, South Brazil.—*Tweedie.*

796. (2.) Chevreulia *stolonifera*, Cass.—*Less. in Linnæa*, 5. *p.* 360.—Tussilago sarmentosa, *Pers.*—Leria cespitosa, *Spr.* —Xeranthemum cespitosum, *Pet. Th.*—Gnaphalium calycinum, *Poir.*—Valparaiso, *Mathews* (*n.* 161); *Cuming* (*n.* 560).—Playa Ancha, near Valparaiso, *Bridges* (*n.* 230).—Fields near Valdivia, *Bridges* (*n* 641).

797. (3?) Chevreulia *gnaphalioides*, Don; suffruticosa procumbens niveo-tomentosa, foliis linearibus mucronatis margine revolutis integerrimis, capitulis terminalibus subcorymbosis, involucri foliolis obtusis, acheniis hirsutissimis.—*Dr. Gillies.*—*Caules* simplices, procumbentes, filiformes, spithamæi. *Folia* sessilia, undique sparsa, patentia, semipollicaria, coriacea, supra demum glabra, nitida. *Capitula* (fæminea tantum vidi) 3 *v.* 5, globosa, densc tomentosa. *Pappus* fulvellus. *Don. in litt.*—With this and the following we are entirely unacquainted, and have some doubts about their belonging to the genus, or even to the tribe. Don, indeed, arranges them next to *Helichrysum* and *Gnaphalium.* Perhaps they are species of *Lucilia.*

798. (4.) Chevreulia *xeranthemoides*, (Don); suffruticosa procumbens niveo-tomentosa, foliis lineari-lanceolatis acutis planis integerrimis, capitulis solitariis, involucri foliolis acutis scariosis, acheniis sericeo-villosis. *Dr. Gillies.* —Palmaris vel spithamæa. *Capitulum* (fæmineum tantum vidi) magnum campanulatum; involucri foliolis ovato-lanceolatis, acutis, scariosis, nitidis, pallide fuscis. *Pappus* cinereus; radiis inferne crassioribus.—*Don in litt.*

799. (1.) Loxodon *brevipes*, Cass.—*Less. in Linnæa*, 5. *p.* 358.—Leria exscapa, *De Cand.*—Tussilago exscapa, *Pers.*—Buenos Ayres, *Tweedie.* — Valparaiso, *Cuming* (*n.* 596); *Bridges* (*n.* 499).—In all our specimens, the achenium is

compressed, and with a very short but decided beak, not cristate as described by Lessing. The numbers of rows of female florets are very inconstant; thus in our specimen from Buenos Ayres, they are all female, with the exception of a few bisexual ones in the centre: among those from Valparaiso, we have found one with two scapes or rather almost sessile capitula, in one of which there are several rows of ligulate florets, the inner ones being reduced almost to mere styles, from the nearly total abortion of the ligula; in the other, there are but two rows, one decidedly ligulate, the other with an abortive ligula. In other specimens also, from Chili, we find the second or inner series so ill defined, as to have induced us, at one time, to suppose that there was but a single row.—Lessing's generic character ought therefore to be slightly modified, thus: *Achenium* brevissime rostratum (haud ut in *Oxyodonte*, longissime ac tenuiter rostratum): flores fœminæi pluri (bi- multi) seriales.—*Chaptalia runcinata*, (Don) is allied to this genus, but rather appears to be a species of *Loxodon;* no notice, however, is taken of the beak of the achenium.

800. (1.) Lieberkuhnia *bracteata*, Cass.—*Less. in Linn.* 5. *p.* 356. Perdicium piloselloides, *Vahl.*—Tussilago piloselloides, *Pers.*—St. Catherine's, South Brazil, *Tweedie.*

801. (1.) Leria *nutans*, D C.—*var. integrifolia.* Less. in Linn. 5. p. 354.—*Don in Linn. Soc. Tr.* 16. *p.* 248.—L. albicans, *DeCand.*—L. integrifolia, *Cass.*—Tussilago albicans, *Ser.*—Leontodon tomentosum, *Linn.*—Monte Video, *Tweedie.*—Lessing's description is very accurate.

Sub-trib. III.—Mutisiæ. *Less. l. c. p.* 93.

802. (1.) Trichocline[1] *incana*, Cass.—*Less. in Linn.* 5. *p.* 287.—Doronicum incanum, *Lam. Ill. t.* 679. *f.* 3.—Arnica incana, *Pers.*—Bichenia sinuata, *Gill. Don in Ph. Mag.* (*Apr.* 1832,) *p.* 391, *in Guille. Arch.* 2. *p.* 467.—Banks of the Rio St. Lucie, and other parts of the Banda Oriental; Province of Entre Rios; Monte Video, Guardia Argentina, in North Patagonia; *Tweedie.* Rio Desaguadero; Province of San Lucia, *Dr. Gillies.*

803. (2.) Trichocline *humilis*, (Less.) scapo foliis subbreviore, foliis profunde pinnatifidis vel bipinnatifidis supra glabris, subter niveo-tomentosis demum glabratis, involucri foliolis exterioribus acuminatis laxis, intimis acuminatis, radii corollæ ligulis extus tomentosis linearibus sub 11-nerviis.—*Less. in Linn.* 5. *p.* 288.—Entre Rios, and Monte Video-Hill, *Tweedie.*—Although our specific character differs slightly from Lessing's, (all other parts of his description agree with our specimens), we have no doubt of the species being the same. We have two forms before us; that from Entre Rios has the outer leaflets of the involucre lanceolate, and much broader than that from Monte Video, in which they are very narrow-linear.

804. (3.) Trichocline *heterophylla*, Less. *in Linn.* 5. *p.* 289.—Plains of Monte Video; *Tweedie.*—Our specimens have the leaves almost glabrous.

805. (4.) Trichocline *Cineraria*, (Hook. *et* Arn.); scapo subæquante, foliis petiolatis ovalibus rugosis subtus tomentosis supra demum subglabratis, petiolo limbo paullum breviore, involucri foliolis omnibus acuminatis, radii ligulis 6-nerviis.—Bichenia Cineraria, *Gill. Don in Ph. Mag.* (*Apr.* 1832,) *p.* 391. *in Guill. Arch.* 2, *p.* 467.—Portezuela, Andes of Mendoza, *Dr. Gillies.*—The filaments are papillose, and the rachis hairy; so that this is a true species of *Trichocline.*

806. (5.) Trichocline *plicata;* "argenteo-tomentosa, foliis aggregatis sessilibus lanceolatis mucronulatis sinuato-plicatis, scapo longitudine foliorum, involucri foliolis ovato-lanceolatis planis denticulatis, radii ligulis 6-nerviis.—Bichenia plicata, *Don Hist.*"—Portezuela of Mendoza and Las Achiras, Province of

[1] We may here remark, with regard to *Onoseris*, placed near this genus by Lessing, that *Chætachlæna*, Don, is the same with Lessing's sub-genus *Cladoseris*, of which the three following species, allied in the shape of the leaves and in being annual, may be thus distinguished. 1. O. *annua*, (Less.) foliis sessilibus oblongo-lanceolatis, involucri foliis extimis innocue mucronatis interioribus breviuscule et subito acuminatis. 2. O. *Cumingii* (Hook. et Arn.) foliis oblongo-lanceolatis basi valde attenuatis vel pseudo-petiolatis, involucri foliolis interioribus apice subulatis subula limbo multo breviori, exterioribus omnino setaceis. North Peru, Lima, &c. *Cuming* (*n.* 995). 3. O. *odorata* (Hook. et Arn.) foliis sessilibus oblongo-lanceolatis basi attenuatis, involucri foliolis interioribus seta flexuosa limbum æquanti terminatis, exterioribus omnino setaceis.—Chætachlæna odorata, *Don.* Purruchuca, in Peru, *Mathews* (*n.* 569).—The two last have a rachis which may be thus described: "rachis paleaceo-fimbrillifera, fimbrillis dentato-laceris."

San Lucie; *Dr. Gillies, Don in litt.*—This we have not seen.

807. (1.) Chætanthera (Bichenia) *dealbata*, foliis aggregatis petiolatis cuneatis repando-dentatis dealbatis, scapo foliis longiore, involucri foliolis lanceolatis acuminatis carinatis.—Bichenia dealbata, *Don MSS.*—Ascent to Los Peuquenes; San Pedro Nolasco, Alto de Laguna; Monte de San Antonio; all in the Andes of Mendoza, Dr. Gillies, *Don in litt.*

808. (2.) Chætanthera (Bichenia) *Berteroana*, Less. Syn. *p.* 111.—Bichenia aurea, *Don in Linn. Soc. Tr.* 18. *p.* 237.—Province of Maule, *Cuming* (*n.* 835).—Perhaps there may be a mistake as to Cuming's locality, as Don states it to be a native of Coquimbo. This differs from all the other species of *Chætanthera*, by having a leafless scape, by the leaves deeply pinnatifid, and the segments either toothed or again pinnatifid, or more essentially by the many-nerved ligulæ of the ray: the habit is entirely that of *Trichocline*, from which it differs by the smooth, not papillose, filaments, glabrous rachis, and Chilian locality. As however, all the species of *Trichocline* have likewise more than four conspicuous nerves, perhaps they and the *Bichenia* of Don ought, on that account, to be united. Mr. Don (*in litt.*) remarks that *Aphyllocaulon, Lag.* is the same with *Bichenia*, but Cassini and Lessing refer it to *Gerbera*, all the species of which are from the Cape.

809. (3.) Chætanthera (Cherina) *microphylla*, (Hook. *et* Arn.) annua glabra multicaulis, caulibus umbellatim semel pluriesve ramosis, foliis lineari-subulatis margine spinuloso *v.* glanduloso-denticulatis, involucri campanulati foliolis omnibus scariosis uninervibus exterioribus late ovatis acutis intimis oblongis acutiusculis.—Charina microphylla, *Cass.*—Euthrixia salsoloides, *Don in Linn. Soc. Tr.* 16. *p.* 259, *β.*; depauperata, foliis lævibus oblongis *v.* cuneato-linearibus mucronatis.—*α.* Valparaiso, on the mountains. *Bridges* (*n.* 129). *Cuming* (*n.* 655, in Herb. Arn. and 659). Cordillera of Chili; *Cuming* (*n.* 206). *β.* Cordilleras, *Cuming* (*n.* 241).—In *β.* the leaves are not broader than in *α.* the type of the species, but shorter: indeed, the whole specimen is stunted, so that this slight difference may be the effect of accident, and not sufficient to mark a permanent variety. Don says that the inner lip of the radical florets is acutely bidentate: it is, in reality, bipartite, and precisely as in his *Euthrixia affinis.* The leaves are from a line to an inch long. *Cherina, Euthrixia,* and Lessing's *Linophyllum,* are the same genus or sub-genus.

810. (4.) Chætanthera (Cherina) *linearis*, (Poepp.) annua glabra! multicaulis, caulibus simplicibus *v.* umbellatim ramosis, foliis angustissime lineari-subulatis spinuloso-serratis, involucri foliolis extimis lineari-lanceolatis acutis subfoliaceis interioribus sensim majoribus scariosis uninervibus intimis obtusis.—*Less. Syn. p.* 112.—Euthrixia affinis, *Don in Ph. Mag.* (*Apr.* 1832, *p.* 391.) *fide Don in Guill. Arch.* 2. *p.* 467.—Llay-Llay on sandy plains, *Bridges* (*n.* 128). Valparaiso, *Cuming* (*n.* 655, *in Herb. Hook.*)—Easily distinguished from the last by the shape of the outer leaflets of the involucre. We do not know *Ch. linifolia*, Bert. According to Lessing's description, the leaflets of the involucre are many-nerved.

811. (5.) Chætanthera (Euchætia anthera) *villosa* (Gill.); villosa perennis(?) caule brevi simplici monocephalo versus apicem densissime folioso, (*cæt. ut in phrasi Doniana.*)—Don *in Ph. Mag.* (*Apr.* 1832,) *p.* 391. *in Guill. Arch.* 2. *p.* 466.—Ascent to El Planchon, Andes of Mendoza, *Dr. Gillies.*

812. (6.) Chætanthera (Euchæt.) *serrata* (R. *et* P.), repens stolonifera, caulibus subsolitariis monocephalis, foliis radicalibus cuneatim oblongo-linearibus, caulinis alternis, involucri campanulati foliolis extimis remote spinuloso-dentatis.—*Ruiz et Pav. Syst.* 1. *p.* 191. *Don in Ph. Mag. Apr.* 1832, *p.* 391. *in Guill.* 2. *p.* 487.—C. Chilensis, *De Cand.*—Proselia serrata, *Don in Linn. Soc. Tr.* 16. *p.* 235.—Perdicium Chilense, *Willd.*—"La Hacienda de Guiti," Province of Valdivia, *Bridges* (*n.* 604).

813. (7.) Chætanthera (Euchæt.) *argentea* (Don); cæspitosa pluricaulis perennis, caule monocephalo, foliis radicalibus cuneato-linearibus apice serratis, involucri campanulati foliolis albidis fere omnibus (intimis exceptis) apice foliaceo-appendiculatis appendiculis cuneato-linearibus versus apicem spinoso-dentatis.—*Don in Ph. Mag.* (*Apr.* 1832,) *p.* 391. in *Guill. Arch.* 2. *p.* 487.—Chilian Andes, *Cuming* (*n.* 182). Valparaiso, *Cuming* (*n.* 658).

814. (8.) Chætanthera (Euchæt.) *tenuifolia* (Gill.); cæspitosa multicaulis perennis, caule monocephalo, foliis radicalibus angustissime cuneato-linearibus versus apicem serratis, involucri campa-

nulati foliolis purpurascentibus, extimis foliaceo-appendiculatis, appendiculis angustissime liearibus.—α. involucri foliolis angustis, capitulo minore.—Chætanthera tenuifolia, *Don in Ph. Mag.* (*Apr.* 1832,) *p.* 391; *in Guill. Arch.* 2. *p.* 467. —Valparaiso, *Cuming* (*n.* 660).—*Mathews* (*n.* 336).—Playa Ancha, near Valparaisa, *Bridges* (*n.* 127).—β. involucri foliolis latiusculis, capitulo majore. Chætanthera *eryngioides*, Gill.—*Don in Ph. Mag.* (*Apr.* 1832,) *p.* 391. *in Guill. Arch.* 2. *p.* 446.—Las Cuevillas, Andes of Mendoza, *Dr. Gillies.*—Quite distinct, but with difficulty characterized from *Chætanthera serrata;* in this however, the stems are very cæspitose, springing in great numbers from the crown of the woody and not creeping root. In *Chætanthera serrata,* the root creeps, and throws out a solitary stem, with barren shoots or stolones; may not this species be *Chætanthera spinulosa,* Cass. ?

815. (9.) Chætanthera (Euchæt.) *ciliata,* Ruiz et Pav. — *Don. in Linn. Soc. Tr.* 16. *p.* 234. *in Ph. Mag.* (*Apr.* 1832,) *p.* 391. *in Guill. Arch.* 2. *p.* 486.—*Less. in Linn.* 5. *p.* 283. *Syn. p.* 113.—Near Collina, *Bridges* (*n.* 132).—Cordilleras of Chili, *Cuming* (*n.* 202).—This is an annual plant.

816. (10.) Chætanthera (Euchæt.) *ramosissima* (Don); annua, caule plus minusve ramoso polycephalo, foliis caulinis sæpius oppositis, capitulo subcylindrico, involucri foliolis extimis patulis angustissimo - linearibus foliaceis apice subtridenticulatis intimis apice scariosis acutis vel acuminatis.—*Don in Ph. Mag.* (*Apr.* 1832,) *p.* 391. *in Guill. Arch.* 2. *p.* 466.—Chætanthera Kunthiana, *Less. Syn. p.* 115. (ad exempla perfectiora.)—Chætanthera mœnchioides, *Less. l. c. p.* 113. (exempla minora.)—Chætanthera tenella, *Less. l. c. p.* 114. (exempla depauperiora.)—Valparaiso, *Cuming* (*n.* 856 *and* 857).—Near Vina de la Mar, *Bridges* (*n.* 124 *and* 125).—Cordilleras of Chili, *Cuming* (*n.* 231 *and* 240).—Very variable, as to branching, the stems being sometimes almost simple. The leaves are usually opposite, but occasionally are, also, alternate on the same specimens: those of the involucre vary from acute to acuminated. The rachis is furnished with a papilla, or soft prickle, under the centre of each achenium, as in Don's *Centroclinium,* and many other genera of the *Compositæ,* both of this and the other tribes. The ray is only slightly, not thrice, shorter than the involucre.

817. (11.) Chætanthera (Prionotophyllum) *incana* (Poepp.); annua multicaulis subincana, caulibus simpliciusculis, foliis spathulato-oblongis alternis vel oppositis, involucri campanulati foliolis extimis foliaceis cuneato-linearibus spinuloso-serratis interioribus scariosis apice rotundatis. — *Less. in Linn.* 5. *p.* 284. *Syn. p.* 116.—Chætanthera spathulata, *Poepp.*—*Less. in Linn.* 5. *p.* 285; *Syn. p.* 116.—Chætanthera scariosa, *Don in Ph. Mag.* (*Apr.* 1832,) *p.* 391. (*fide Don*) *in Guill. Arch.* 2. *p.* 466.—Chætanthera Chilensis, *Hook. et Arn. in Bot. Beech. Voy. p.* 29. (*excl. syn.*)—Valparaiso, *Cruckshanks; Macrae; Dr. Gillies; Messrs. Lay* et *Collie; Mathews* (*n.* 239); *Bridges* (*n.* 130); *Cuming* (*n.* 661 *and* 662).—We have united Lessing's two species, having found that both the colour and shape of the outer lip of the ray-florets are subject to considerable variation.

818. (12.) Chætanthera (Prion.) *flabellata* (Don); annua glabra! multicaulis ramosiuscula, foliis oppositis alternisve, involucrique campanulati foliolis exterioribus cuneatis duplicatis argute spinuloso-serratis.—α. foliis foliolisque exterioribus cuneati-obovatis.—Chætanthera flabellata, *Don in Ph. Mag.* (*Apr.* 1832,) *p.* 391. *in Guill. Arch.* 2. *p.* 466.—Cordilleras of Chili, *Cuming* (*n.* 291). — Sierra Bella vista Aconcagua, *Bridges* (*n.* 131).—β. foliis foliolisque extimis cuneati - oblongis. Chætanthera prostrata, *Don in Ph. Mag.* (*Apr.* 1832,) *p.* 391. *in Guill. Arch.* 2. *p.* 467.—San Pedro Nolasco, Andes of Chili, *Dr. Gillies.*

819. (13.) Chætanthera (Tylloma) *limbata,* Less. *Syn. p.* 116.—Tylloma limbatum, *Don in Linn. Soc. Tr.* 16. *p.* 239.—La Cuesta de Zapata, Chili, *Dr. Gillies,* near Vina de la Mar, *Bridges* (*n.* 124).—Aconcagua, Cuesta Zapata, and Cordillera, *Bridges* (*n.* 128).—Cordillera of Chili, *Cuming* (*n.* 314).—The surface, as well as the margin of the leaves, is frequently sprinkled with pedicellate glands, as noticed by Mr. Don; the margin, therefore, appearing as if furnished with glandular teeth. The pappus is said, by Don, to be α. in a simple series. Lessing says, "pluri- nec uniserialis ut in reliquis," perhaps meaning the reverse, for though his generic character is "pluri-serialis," it really, however, consists of, at least, two rows;

the outer is pilose and very caducous; the inner is persistent, and has its rays broader at the base, so that it is almost paleaceo-setaceous. The same kind of pappus occurs in *Chætanthera ciliata*, and one or two others. There is an inner, though very short, bifid lip to the ray.

820. (14.) Chætanthera (Tylloma) *pusilla*, Hook. *et* Arn. — Tylloma pusillum, *Gill. Don in Ph. Mag.* (*Apr.* 1832,) *p.* 391. *in Guill. Arch.* 2. *p.* 467 (*ubi, pro* labello interiore, &c. *legendum:* labello bidenticulato). Las Hyades, and Valle del Yeso, Andes of Mendoza and Chili, *Dr. Gillies.*—Although we have pointed out a mistake of the transcriber of the French edition of Don's paper, the outer lip of the ray is really not bidenticulate, but distinctly with three teeth; we have not been able to observe an inner lip.

PACHYLÆNA. *Don, MSS.*

821. "*Involucrum* subrotundum, multiplici ordine, polyphyllum, foliolis oblongis, obtusis, coriaceis, adpressis, glabris, intimis longioribus, radiantibus. *Rachis* nuda. *Flosculi radii* elongati, ligulati fæmineis staminibus sterilibus, labello interiori tenuissimo bipartito subsetaceo instructi; *disci* hermaphroditi, bilabiati, labiis subæqualibus revolutis; exteriore ligulato, 3-dentato; interiore bipartito, laciniis lineari-attenuatis, spiraliter revolutis. *Filamenta* anguste linearia, canaliculata, lævissime glabra. *Antheræ* in tubum coalitæ, alâ lineari-mucronulata callosa coronatæ, basi bisetosæ; setis longis, extremitate lacerato-penicillatis. *Styli* rami crassi, obtusi, elevati, conniventes, glaberrimi, apice læviter soluti. *Achenia* cuneata, glabra, dilatata.—Herba *perennis, multicaulis, cæspitosa, prostrata, glauca.* Caules *erecti, bipollicares, simplices, teretes, rubicundi, basi foliis abortivis ligulatis membranaceis ornati.* Folia *alterna; petiolata, late ovata, obtusa, erose denticulata, coriacea, glaberrima, bipollicaria, subtus purpurascentia, costa valida venisque prominentibus.* Petioli *dilatati, complanati, bipollicares.* Capitulum *terminale, solitarium, magnum, sessile.* Corollæ *albæ.* Involucrum *glabrum.* Pappus *niveus.*—Genus *Ptiluro*, admodum affine, sed satis differt."—*Don in litt.*

822. (1.) *P. atriplicifolia*, Don.—On loose débris, near Agua del Ceno Pelado, on the ascent to El alto de los Manantides. *Dr. Gillies.*—This differs from *Chætanthera* by the non-plumose pappus, and apparently by the style of the bisexual florets not being pulverulous.

BRACHYCLADOS. *Don,* (char. reform.)

823. "*Involucrum* 5-phyllum, basi bracteolatum; foliolis ovato-lanceolatis acuminatis, carinatis. *Rachis* nuda. *Flosculi radii* uniseriales ligulati, fæminei, staminibus sterilibus, labello interiore lineari bifido revoluto aucti; *disci* hermaphroditi, tubulosi, limbo bilabiato: labiis subæqualibus, revolutis; exteriore tridentato; interiore bipartito. *Filamenta* glabra, lævia. *Antheræ* basi bisetosæ: setis plumosis. *Stylus* radio indivisus, obtusus, sulcatus, glaber, recurvatus, disco lobis abbreviatis, cuneatis, dilatatis, pruinosis. *Achenia* cuneata, 5-gona, erostrea, dense papillosa. *Pappus* capillaris, scaber, persistens, pluri-serialis, cinereûs.—Frutex *rigidis ramosissimus.* Folia *fasciculata, linearia, mucronata, margine revoluta, integerrima.* Capitula *terminalia, solitaria, pedunculata.*" Don *in litt.*

824. (1.) *B. lycioides*, Gill.—*Don in Ph. Mag.* (*Apr.* 1832,) *p.* 391. *in Guill. Arch.* 2. *p.* 467.—Between Domo del Imperial and Yeso de las Salinas, Andes of Mendoza, *Dr. Gillies.* Guardia Argentina, North Patagonia, *Tweedie.*—We know of no character, except that of the involucre, to separate this from *Chætanthera*, from which the habit is so very different, that the two genera ought not to be conjoined.

825. (1.) Proustia *pyrifolia*, De Cand.—*Less. in Linn.* 5. *p.* 280. *Don in Linn. Soc. Trans.* 16. *p.* 198.—Near Conception; *Messrs. Lay & Collie, Chamisso*,—Valparaiso, climbing the highest trees, *Bridges* (*n.* 361); *Cuming* (*n.* 69).—Concon in Chili, *Dr. Gillies.*

826. (2). *P. baccharoides* (Don); fruticosa, foliis oblongis mucronatis dentato-spinulosis subtus niveo-tomentosis, capitulis 3-floris paniculatis, involucri foliolis obtusis. Mendoza, *Dr. Gillies.*—*Folia* bi-tripollicaria. *Rachis* plana. *Corollæ* alba. *Achenia* pilosa. *Pappi radii* albi apice penicillati. *Don in litt.*—This we have not seen, but we possess a specimen from Coquimbo, in which the capitula are quite unexpanded, but which agrees otherwise with Don's character.

827. (3.) *P. cuneifolia*, Don *in Linn. Soc. Trans.* 15. *p.* 202.—*α. spinulosa;* foliis petiolatis cuneato-oblongis spinu-

loso-mucronatis dentatisque basi attenuatis.—P. pungens, *Poepp. Less. Syn. p.* 110.—β. *integrifolia ;* foliis brevissime petiolatis lineari-lanceolatis subintegerrimis basi attenuatis, pappo fulvello.—γ. *ilicifolia ;* foliis brevissime petiolatis oblongis mucronatis margine dentato-spinulosis undulatisque basi plerumque obtusis vel truncatis utrinque pallide viridibus reticulato-venosissimis, pappo cinereo.—P. ilicifolia, *Hook. et Arn. in Bot. Beech. Voy. p.* 28. *Don in litt.*—α. San Pedro near Quillota, *Bridges* (*n.* 362). Province of Maule, *Cuming* (*n.* 852). — γ. Coquimbo, *Messrs. Lay & Collie.*—Jarillal Mendoza, *Dr. Gillies.*

828. (1.) Mutisia (Guarizuma) *spinosa*, R. et P. (non Less).—M. ilicifolia, *Cav. Ic.* 5. *t.* 493. *Hook. Bot. Misc.* 1. *t.* 4. *Don in Linn. Soc. Trans. p.* 268.—Cordilleras of Chili, *Cuming* (*n.* 304 *and* 306). *Bridges* (*n.* 304).—Below La Sepultura, Andes of Chili, *Dr. Gillies.*—Villa Vicenzia in Chili, *Cruckshanks.*—Province of Maule, *Cuming* (*n.* 838). St. Mary, South Patagonia, *Dr. Beck.*—Cuming's *n.* 306, has the flowers twice as large, and his *n.* 838, twice as small as the usual size. So far as we can judge from Mr. Don's description, his *M. truncata* is a young state of this plant; Cuming's specimen, from Maule, has the leaves of the form described by him, but, when closely examined, they are certainly veined.

829. (2.) Mutisia (Guarizuma) *auriculata*, Poepp.—M. spinosa, *Less. Syn. p.* 105. (*non R. et Pav.*)—Near El Castillo del Niebla, Bay of Valdivia, *Bridges* (*n.* 667).

830. (3.) Mutisia (Guarizuma) *latifolia*, Don *in Linn. Soc. Trans.* 16. *p.* 270. *Less. Syn. p.* 104.—Valparaiso, *Cuming* (*n.* 438); *Bridges* (*n.* 300); Baths of Collina, *Macrae.*

831. (4.) Mutisia (Guarizuma) *retrorsa*, Cav. *Ic.* 5. *t.* 495. *Less. Syn. p.* 105. *Don in Linn. Soc. Trans.* 16. *p.* 266.—M. runcinata, *Willd. Hook. Bot. Misc.* 1. *t.* 5.—Cerro del Diamante, San Isidro, Mendoza, *Dr. Gillies.*—East Coast of South Patagonia, *Dr. Beck.*

832. (5.) Mutisia (Guarizuma) *sinuata*, Cav. *Ic.* 5. *t.* 499. *Less. Syn. p.* 105. *Don in Linn. Soc. Trans.* 16. *p.* 267.—Villa Vicenzia and Punta de los Vaccas, Andes of Mendoza, *Dr. Gillies.*—Cordilleras of Chili, *Cuming* (*n.* 309 *and* 310). — Cordillera and Mountains of Aconcagua, *Bridges* (*n.* 306). — The leaves are always more or less decurrent, and are frequently furnished only with a mucronate point, instead of a tendril. We do not know *M. taxifolia, Less.;* but it appears to approach too closely some of the forms of this species.

833. (6.) Mutisia (Guarazuma) *subspinosa*, Cav. *Ic.* 5. *t.* 495. *Hook. Bot. Misc.* 1. *t.* 7. (*excl. Syn.*) M. sinuata.—Arroyo del Truyan, and Valle del Yeso, Andes of Mendoza and Chili, *Dr. Gillies.*

834. (7.) Mutisia (Holophyllum) *subulata*, R. et Pav. *Less. in Linn.* 5. *p.* 273. *Syn. p.* 106. — M. inflexa. *Cav. Don in Linn. Soc. Trans.* 16. *p.* 270.—α. *Cavanillesii;* glabra, caule gracili foliis magnopero reflexis haud decurrentibus, radii ligulis atro-purpureis.—*M. inflexa, Cav. Ic.* 5. *t.* 496. *Hook. Bot. Misc.* 1. *t.* 6. —β. *rosea ;* caule gracili sublanuginoso, foliis patenti-reflexis superioribus anguste decurrentibus, capitulo minore, radio flavescenti-rubello. — *M. rosea, Less. Syn. p.* 106. — γ. *major,* caule validiore, foliis latioribus suberecto-patentibus haud decurrentibus, capitulo paullo majore quam in α., radio flavescenti-roseo.—α. Alto del Puente, Chili, *Mr. Cruckshanks.* Valparaiso, *Dr. Beck. Cuming* (*n.* 88).—Caxon de Zapata, in Chili, *Dr. Gillies.*—β. Cordillera of Chili, *Bridges* (*n.* 302). *Cuming* (*n.* 308). —γ. Cordillera of Chili, *Dr. Gillies.*—*Cuming* (*n.* 307).—Cordillera and Mountains of Aconcagua, *Bridges* (*n.* 305).—The outer lip of the ray is three-toothed, not entire, as Lessing seems to say in his Synopsis, although in the *Linnæa* (*l. c.*) he describes it correctly. We gladly adopt the older name, given by Ruiz and Pavon, as the leaves are neither inflexed, nor have they an inflexed margin.[1]

835. (8.) Mutisia (Holophyllum) *acerosa*, Poepp.—*Less. Syn. p.* 107.—M. ulicina, *Don in Phil. Mag.* (*Apr.* 1832,) *p.* 391, *in Guill. Arch.* 2. *p.* 467.—Cordillera of Chili, *Cuming* (*n.* 305.)—Cordillera and Mountains of Aconcagua, *Bridges* (*n.* 303.)

836. (9.) Mutisia (Aplophyllum) *linearifolia, Cav. Ic.* 5. *t.* 500. *Hook. Bot. Misc.*

[1] Very closely allied to this species, and somewhat intermediate between it and M. *hastata*, Cav., is *M. Mathewsii*, (Hook. and Arn.); foliis integerrimis cirrho simplici terminatis angustissime linearibus margine revolutis non decurrentibus basi acute ac breviter sagittatis. Vilcacota in Peru, *Mathews* (*n.* 1119). —Axils of the leaves woolly. The leaflets of the involucre have a short, lanceolate, foliaceous appendage, which in the upper ones is often woolly. This is readily distinguished from *M. subulata*, by the sagittate base of the leaves.

t. 8. *Don in Linn. Soc. Trans.* 16. *p.* 272. *Less. Syn. p.* 108.—Andes of Chili, at Los Ojos de Agua. Quebrada de Rios. Los Impossibiles, on the Western descent from El Planchon; and La Vega del Flaco, near El Casco de las Damas, *Dr. Gillies.*

837. (10.) Mutisia (Aplophyllum) *linifolia.*—Hook. *Bot. Misc.* 1. *t.* 9. *Less. Syn. p.* 108.—Caxon near El Agua del Lorro. Andes of Mendoza, *Dr. Gillies.*

HYALIS. *Don.*

838. *Involucrum* polyphyllum, adpresse imbricatum. *Rachis* epaleata, fimbrillis callosis brevibus singulo sub achenio singulo instructa. Hook. et Arn. *Flosculi* 4—6, sæpius 5, æquales, hermaphroditi, bilabiati, labio exteriore maximo ligulati, tridentato; interiore profunde bipartito; segmentis solutis, linearibus acuminatis revolutis. *Filamenta* linearia, complanata, glabra, lævia. *Antheræ* in tubum coalitæ, alâ lanceolata acuminata callosa coronatæ, basi bicaudatæ: setis longis laceris plumosis. *Stylus* filiformis, glaberrimus; ramis emicylindrici, crassi, obtuse conniventes, superficie stigmatica iisdem latiore. *Achenia* ovato-oblonga, ventricosa, erostria, 10-costata; costis elevatis, basi approximatis crassioribusque. *Pappus* persistens; radii triplici ordine copiosissimi, inequales, pilosi, denticulis versus apicem longioribus exasperati, ima basi connati.—Herba *perennis, multicaulis, tota pube implexa copiosa argentia.* Radix *repens.* Caules *erecti, simplices, angulati, pedales vel ultra.* Folia (Bupleuri) *sessilia; lanceolato-linearia, acuminata, integerrima, nervosa, tripollicaria, basi attenuata.* Capitula *terminalia, oblonga, paniculato-corymbosa.* Corollæ *albæ.* Pappus *albus.*—Genus *Proustiæ* affine, sed abunde distinctum. *Don in litt.*

839. (1.) H. *argentea*, Don MSS.—Vernonia argentea, *Gill. MSS.*—*α.* involucri foliolis oblongo-lanceolatis acuminatis versus apicem nervis tribus conspicuis purpureis instructis.—*β.* involucri foliolis ovato-oblongis acutiusculis subenervibus.—*α.* Mendoza, *Dr. Gillies.*—*β.* Rio Quarto, Province of San Louis; and Villa del Rio Quarto, Pampas of Cordova, *Dr. Gillies.*—Salt Plains of Bahia Blanca, North Patagonia, growing in patches, to the extent of acres, to the exclusion of almost every thing else, *Tweedie.*—This differs from *Proustia* by the rachis not being hairy, by the pappus, and by the perfectly glabrous style.

840. (1.) Gochnatia (Hedraiophyllum) *cordata*, Less. *in Linn.* 5. *p.* 263. *Syn. p.* 103.—On the highest mountains and hard dry barren plains of Portalegre, Rio Grande, and Rio Jacquety, *Tweedie.*

Subgenus PENTAPHORUS. *Don.*

Frutices Chilenses v. Mendocinenses, foliis sessilibus, basi attenuatis, demum glabratis resinosisque, capitulis 5 v. multifloris, aggregatis, homogamis æqualifloris, involucro flosculis breviore, caudis antherarum integris; styli ramis perbrevibus.

841. (2.) Gochnatia (Pentaphorus) *fascicularis*, Don *in litt.*—Pentaphorus fascicularis, *Gill. Don in Phil. Mag.* (*Apr.* 1832,) *p.* 392, *in Guill. Arch.* 2. *p.* 468. —San Gabriel and La Sepultura, Andes of Chili, *Dr. Gillies.*—This is distinguished from all the following species of this sub-genus, by the numerous florets in the capitulum.

842. (3.) Gochnatia (Pentaphorus) *pyrifolia*, Don *in litt.*—Pentaphorus pyrifolius, *Gill. Don in Phil. Mag.* (*Apr.* 1832,) *p.* 392. *in Guill. Arch.* 2. *p.* 468. —Caxon del Rio Tinguirica, Andes of Chili, *Dr. Gillies.*

843. (4.) Gochnatia (Pentaphorus) *rigida*, Don, "foliis oblongis mucronulatis, denticulatis venosis ramulisque primum lanuginosis, capitulis fasciculato-corymbosis, involucri foliolis ovatis mucronatis (in exemplis nostris) lanceolatis acuminatis, (*Hook. and Arn.*) pappo subpaleaceo.—San Gabriel, Andes of Chili, and San Isidro, Andes of Mendoza, *Dr. Gillies.*"—Valparaiso, *Bridges* (*n.* 364). *Cuming* (*n.* 70).—"Frutex rigidus, ramosissimus. Folia pollicaria, sesquipollicaria, resinosa. Capitula 5-flora. Pappus cinereus." *Don in litt.*—We have not seen the original specimen from Dr. Gillies' Herbarium, but Mr. Don named for us that from Mr. Bridges, which appears to us to differ in no respect from *G. pyrifolia*, except by the leaves being narrower. We have not seen *G. foliolosa*, Don *in litt.* (*Pentaphorus foliolosus*, Don *in Linn. Soc. Trans.* 16. *p.* 297), but from the description it appears to be another variety of the same species, having broad (*i. e.* obovate) and quite entire leaves. If our opinion be correct, the latter name must be adopted; the species would then be distinguished from the next by the more or less oblong veined leaves.

844. (5.) Gochnatia (Pentaphorus) *glu-*

tinosa, Don *in litt.*—Pentaphorus glutinosus, *Gill. Don in Phil. Mag.* (*Apr.* 1832,) *p.* 392. *in Guill. Arch.* 2. *p.* 468. —Mendoza. *Dr. Gillies.*—The capitula are five-flowered and cylindrical, leaflets of the involucre lanceolato-subulate; pappus tawny-coloured.

Subgenus? NARDOPHYLLUM.

Frutex ramis albo-tomentosis; foliis sessilibus linearibus subtus tomentosis; capitulis 5-floris, solitariis homogamis æqualifloris; styli ramis longiusculis! pappo plumoso!

845. (6.) Gochnatia (Nardophyllum) *revoluta* (Don); foliis linearibus mucronatis margine revolutis subtus ramulisque lanuginosis, involucri foliolis scariosis mucronatis, pappo subplumoso.—Pentaphorus rosmarinifolius, *Gill. MSS.* —La Travesia and La Punta, Province of San Louis, *Dr. Gillies.*—Cordillera of Chili, *Cuming* (*n.* 185).—Frutex erectus, rigidus. Folia unguicularia. Capitula in ramulorum apice solitaria, 5-flora, oblonga. Involucrum scariosum, album. *Pappus* cinereo-fulvellus. *Don, in litt.*—We have not seen Dr. Gillies' specimens from the eastern side of the Andes; but the above description, taken from them, agrees so well with those which we possess from Chili, from Cuming, that we can scarcely doubt of their proving one and the same species. Cuming's are only in bud, but from them we have added the description of the style (which is perfectly glabrous), and of the pappus: the leaflets of the involucre are broadly ovate, with a rather long mucro; we have not been able to ascertain the structure of the caudæ at the base of the anthers.

Subgenus? CYCLOLEPIS. *Don.*

Frutex canescens, foliis lineari-lanceolatis planis, subsericeis; capitulis multifloris, sparsis, homogamis æqualifloris; pedunculis perbrevibus squamis coriaceis minutis rotundatis tectis, antherarum caudis laceris; styli ramis linearibus, longiusculis! pappo paleaceo-setoso.

846. (7.) Gochnatia (Cyclolepis) *genistoides*, Hook. *et* Arn.—Cyclolepis genistoides, *Gill. Don in Phil. Mag.* (*Apr.* 1832,) *p.* 392, *in Guill. Arch.* 2. *p.* 468. —Nom. vern., *Usillo.*—Mendoza, *Dr. Gillies.* Guardia Argentina, North Patagonia, *Tweedie.*—"At Guardia Argentina, the woody parts of this shrub, no better than the stumps of an old Whinbush, afford the only fire-wood." *Tweedie.*—Mr. Don is still disposed to keep up the genus *Cyclolepis*, and has forwarded to us an enlarged generic character, which we add, though we can point out no difference between it and *Gochnatia*, except the longer branches of the style:

CYCLOLEPIS. *Involucrum* multiplici ordine polyphyllum, globosum, imbricatum; foliolis subrotundis adpressis, scariosis, dilatatis. *Rachis* nuda. *Flosculi* infundibuliformes, hermaphroditi limbo 5-partito æquali revoluto. *Filamenta* complanata, lævia. *Antheræ* basi bisetosæ setis laceris. *Styli* rami semicylindracei, obtusi, recurvati, glaberrimi. *Achenia* longiuscula, angulata, sericea. *Pappus* setaceo-paleaceus, longus, persistens, pluriserialis, fulvellus; radiis apice profundis serratis.—Frutex *ramosissimus, canescens.* Rami *denudati, teretes, striati.* Folia *sparsa, lanceolata, acuta, plana, integerrima, sericea, capitula per ramos sparsa, subsessilia.*"

847. (1.) Spadonia *polymorpha*, Less. *Syn. p.* 101.—Rio Grande, *Treedie.*

848. (2.) Spadonia *cinerea* (*Hook. et Arn.*) foliis late ovatis ovalibusque mucronulatis rarius denticulatis supra resinoso-nitidis subtus tomento brevissimo pallide cinereo tectis, capitulis 3—6-nis brevissime pedicellatis subracemoso fasciculatis, involucri maris subcylindraceo 6—10-floro floribus breviori, foliolis villoso-incanis ciliatis exterioribus ovatis obtusis intimis oblongis acutiusculis.—Rio Jaquety and Rio Grande, *Tweedie.*

849. (1.) Chuquiraga *oppositifolia*, Gill.—*Don in Phil. Mag.* (*Apr.* 1832,) *p.* 392. *in Guill. Arch.* 2. *p.* 468.—C. alpina, *Less. Syn. p.* 96.—Valle de las Lenas Amarillas, Andes of Mendoza, *Dr. Gillies.*—Cordillera of Chili, *Cuming* (*n.* 234).—Los Ojos de Aqua, *Bridges* (*n.* 492).

850. (2.) Chuquiraga *ruscifolia*, Gill.—*Don in Phil. Mag.* (*Apr.* 1832,) *p.* 392. *in Guill. Arch.* 2. *p.* 468.—Paramillo de Uspallato, Andes of Mendoza, *Dr. Gillies.*

851. (3.) Chuquiraga *hystrix*, Gill.—*Don in Phil. Mag. l. c. in Guill. Arch. l. c.*—Ascent from Portezuelo, Domo del Imperial, Andes of Mendoza, *Dr. Gillies.*—East coast of South Patagonia, *Dr. Beck.*

852. (5.) Chuquiraga *acicularis*, Don *in Phil. Mag. l. c. in Guill. Arch. l. c.* Coquimbo, *Cuming* (*n.* 878).

853. (5.) Chuquiraga *erinacea*, Gill.—*Don in Phil. Mag. l. c. in Guill. Arch. l. c.* Los Gegenes, Mendoza, *Dr. Gil-*

lies.—Guardia Argentina, half-way between Arroyo de Naposta and the top of Los Llamas, North Patagonia, where it is called Herba del Perdice, *Tweedie.*—Mr. Tweedie adds that it seems to grow only at a certain elevation, and there forms a long narrow line not exceeding half a mile broad.

854. (6.) Chuquiraga *ulicina*, Hook *et* Arn.—C. incana, *Don Phil. in Mag. l. c. fide Don. in Guill. Arch. l. c.*—Barnadesia? *ulicina, Hook. et Arn. in Bot. Beech. Voy. p.* 29.—Coquimbo, *Messrs. Lay & Collie; Cuming* (*n.* 877).

855. (7.) Chuquiraga *anomala*, Gill.—*Don in Phil. Mag. l. c. in Guill. Arch. l. c.*—Above and below El Hoyo Colorado, Andes of Mendoza, *Dr. Gillies.*

PIPTOCARPHA. *Hook. et Arn.*

856. *Involucrum* turbinato-campanulatum polyphyllum imbricatum; foliolis adpressis villoso-ciliatis. *Capitula* multiflora, homogama, homocarpa, hermaphrodita vel abortu unisexualia (tum semper fæminea 2), æqualiflora, discoidea. *Rachis* villoso-fimbrillifera, bracteolata! bracteolis angustissime linearibus superne plumoso-ciliatis caducis. *Corolla* subpalmata (inæqualiter profunde 5-fida), extus glabra, intus parce villosa; laciniis apice barbato-ciliatis. *Filamenta* libera, glabra. *Antheræ* subecaudatæ; caudis brevissimis rotundatis. *Stylus* longe exsertus, superne in flosculis hermaphroditis hispido-pubescens. *Achenium* erostre, breve, longe denseque sericeo-villosum. *Pappus* uniserialis, longus, multipaleaceus, plumosus, æqualis; paleis angustissimis acuminatis; pilis e tuberculo ortis.—Arbores *vel* frutices, *ramosi, aculeati, aculeis vice stipularum gerentibus.* Rami *lenticellis petiolorumque delapsorum cicatricibus obsessi, juniores hirsuto-pubescentes.* Folia *petiolata, alterna, rigida, penninervia, reticulato-venosa, nitida, adulta glabra, margine subcorneo incrassato, integerrima pungento-mucronata.* Petioli *hispido-pubescentes, supra canaliculati, cum ramis articulati.* Flores *solitarii dense spicati.*—Genus *a Flotovea, Chuquiraga,* omnibusque aliis hujus tribus Compositarum distinctum rachide paleata.

857. (1.) Piptocarpha *diacanthoides*, (Hook *et* Arn.); fruticosa, capitulis solitariis, involucri foliolis dorso glabris subtriserialibus, flosculis (semper?) hermaphroditis.—Flotovia diacanthoides, *Less. Syn. p.* 95.—Nom. vernac. *Palo Mato.*—Near the Laguna de Ranas, Province of Valdivia, *Bridges* (*n.* 789).—Lessing says that the style is quite glabrous; in our specimens it is as in *Chuquiraga.* Perhaps he has examined capitula that contained imperfect anthers; but all our's were truly bisexual.

858. (2.) Piptocarpha *excelsa*, (Hook. *et* Arn.); arborea, capitulis dense breviter spicatis, involucri foliolis dorso tomentosis sex-serialibus, flosculis (semper?) abortu dioicis.—Chuquiraga excelsa, *Don in Phil. Mag.* (*Apr.* 1832,) *p.* 392. *in Guill. Arch.* 2. *p.* 468.—Port House, Tablas, and the Lagunillo near Valparaiso, growing to the height of from thirty to sixty feet, with a girth of nine feet. *Cuming* (*n.* 328).—In all the specimens we have seen, the anthers were very imperfect.

859. (8.) Schlechtendalia *luzulæfolia*, Less. *in Linn.* 5. *p.* 243, *Syn. p.* 93.—Dry claybanks, at the mouth of Rio St. Lucie, and Monte Video Hill, *Tweedie.*

TRIB. IV.—CYNAREÆ. *Less. Syn. p.* 4.

860. (1.) Centaurea *Chilensis*, Bert.—*Hook. et Arn. in Bot. of Beech. Voy. p.* 33.—Conception, *Messrs. Lay and Collie.* Valparaiso, *Mr. Cruckshanks; Mathews* (*n.* 219). *Bridges* (*n.* 118). *Cuming* (*n.* 580).—Cordilleras of Chili, *Macrae; Cuming* (*n.* 215).—The stem of this species is simple, and bears only one capitulum.

861. (2). Centaurea *floccosa*, (Hook, *et* Arn.); caule suffruticoso ramoso basi præcipue albo-tomentoso, ramis monocephalis elongatis, foliis pinnatifidis utrinque breviter albide floccoso-tomentosis, segmentis linearibus vel oblongis acutis, capitulo basi aphyllo globoso-campanulato, involucri foliolis apice scariosis pectinatis.—Andes of Chili, *Cuming* (*n.* 171). Mountains near Los Locos, Cordillera of Chili, *Bridges* (*n.* 117).—This belongs to Mr. Don's subgenus *Plectrocephalus.*

862. (3.) Centaurea *Tweediei* (Hook. *et* Arn.); caule elato (4—5 pedali) erecto angulato glabro, ramis floriferis elongatis monocephalis, foliis superioribus lineari-lanceolatis integerrimis glabris scabris, capitulo late campanulato, involucri glabri foliolis longitudinaliter multistriatis apice ciliatis exterioribus ovatis mediis oblongis intimis lanceolatis apice purpurascentibus, flosculis rubris radii nullis.—Plains of Entre Rios; moist ground on the coast of Rio St. Lucie,

Banda Oriental; Wood on the South side of Lago de Lospillos and North Patagonia, *Tweedie.*—Very closely allied to *C. sempervirens*, but the specimens before us of that species (from the Avignon Garden), have the capitula ovate or nearly globose, and the leaflets of the involucre are smooth without any striæ.

863. (4.) Centaurea *bulbosa*, (Hook *et* Arn.) radicis collo tuberiformi lanato, caule humili subsimplici scabro usque ad capitulum dense foliato, foliis inferioribus pinnatisectis, superioribus linearibus integerrimis margine revolutis pubescenti-scabris, capitulo turbinato, involucri foliolis late scarioso-marginatis spinula rigidiuscula brevi terminatis, flosculis radii neutris.—C. aspera, *Dombey, MSS.* (*non Linn.*) — La Plasilla, near Valparaiso, *Bridges* (*n.* 119); *Cuming* (*n.* 396).

864. (5.) Centaurea *elongata*, (Schousb.) — C. diluta, *Ait.? Salzm. Pl. Tang.* (*certe*). Buenos Ayres (probably cultivated), *Tweedie.*

865. (6.) Centaurea *ferox*, (*Desf.*) — Buenos Ayres (*cult.*) *Tweedie.*

866. (7.) Centaurea *Apula*, Lam.—*Less. in Linn.* 6. *p.* 86.—C. Americana, *Spr. Syst. Veg.* 3. *p.* 407.—C. Patibilcensis, *H. B. K.*—Juan Fernandez, *Douglas.* Valparaiso, *Bridges* (*n.* 116).—Plentiful on all dry banks near Buenos Ayres, and on Monte Video Hill, *Tweedie.* Pampas of Buenos Ayres and Mendoza, *Dr. Gillies.*—All the specimens under the name of *C. Melitensis*, which we have seen, do not differ from this species.

867. (8.) Centaurea *Calcitrapa*, Linn.—Monte Video, rough places by the side of La Plata (perhaps introduced). — *Tweedie.*

868. (1.) Carthamus *tinctorius*, Gærtn. —Buenos Ayres (*cult.*), *Tweedie.*

869. (1.) Cynara *Scolymus*, Linn.—Carduus Scolymus, *Less. Syn. p.* 9.—Buenos Ayres (introduced), *Dr. Gillies; Tweedie.*—Mr. Tweedie writes, "this is called here *Cardo de Castilo*; it is a lasting perennial, and grows in deep clay; the farmers prefer it to a field of wheat, the stems being excellent oven-wood, and bringing good profit with little cost; the fine blue flowers are in general use for thickening milk, which is effected by simply dipping them into the dish."

(To be continued.)

PHYSICAL AND GEOGRAPHICAL OBSERVATIONS MADE IN COLUMBIA.

By Professor William Jamieson, of Quito.

(*Communicated by the Author.*)

Climate is one of the first agents which operates on the propagation of the human race over the face of the globe, presenting itself sometimes as a benignant conductor; at others raising a hostile barrier which science and industry slowly overcome. The Spaniards, who peopled that part of South America, now under consideration, as soon as they had formed, on the coast, the establishments necessary to preserve their connexion with the mother country, seem to have traversed, hastily, the fertile but insalubrious low-lands, to meet on the Cordillera, a temperature adapted to their habits and constitution. The dominion of the Incas had, upon similar principles, extended itself along the immense ridge; and the descendants of the conquerors and conquered are, to this day, found united on the same elevations, from whence the population has descended gradually into the plains; and would have done so much more slowly, but for the importation of the African race, who find, on the sandy coast and sultry savannah, a climate congenial to their constitution. It may be a matter of curiosity to enquire, why that portion of the *bronzed* race, which constituted the empire of the Incas and of the Zipas, has constantly exhibited a constitutional type so different from the tribes of the same race, now thinly scattered through the plains and valleys. The dominion of the Incas could scarcely be said to have established itself in the lowlands. With the exception of the dry narrow tract of the Peruvian coast, their empire was exclusively of the mountains; and the Indians who speak the *Quichua* or general language of the Incas, still manifest the same preference for cold and elevated situations, sleeping in the open air, rather than under a roof, and exhibiting an unsurmountable repugnance to descend into the hot country, where they fall victims more rapidly

than even the Europeans. The latter, although commercial interests have led them to form establishments on the coasts, and more partially on the great rivers, may be said to live in a state of perpetual hostility with the climate. Their complexions become sallow; their frames feeble; and, although where heat is uncombined with great moisture, as in Cumanà, Cero, and Maracaybo, they are subject to few diseases of a violent character; the strength is gradually undermined, and the species may be rather said to vegetate than to increase. The individuals of African race, who complain of cold when the yearly mean is 75°, alone develop all the physical strength and energy of their character in the hot lowlands of the coast and interior. The mixed race, or people of colour, unite to bodily hardihood, intrepidity, ambition, and a deadly feeling of those prejudices which, in spite of laws, continue to separate them from the *white* descendants of the Spaniards, who thus encounter, both in the high and lowlands, two races, in whom the seeds of hostility have been sown by injustice; and, fostered by mistaken feelings of interest and vanity, know not how soon they may ripen to a vengeance destructive of all the prospects of civilization. It is on the mountain slopes of from 3,000 to 7,000 feet, we meet with a climate analogous to our ideas both of health and pleasure. Raised above the noxious miasmata of the coast, we dwell in perpetual summer, amid the rich vegetable productions of nature — amid a continued succession of fruits and flowers. This picture, however, must not be considered as universally exact. In the unbroken forests, where population has made little progress, the sky is often clouded, and the soil deluged with continual rains. The western declivities of the Andes, which front the Pacific, are particularly exposed to this inconvenience.

It might be expected that, with regard to human life and vigour, the elevated plains of the Andes would correspond to the northern countries of Europe. This, however, as far as regards the inhabitants of European race, does not seem exactly to take place. It is true they escape the bilious and intermittent fevers, so prevalent in the lowlands; but they are generally subject to typhus, dropsy, goitre, and such complaints as indicate constitutional debility. Nor do we find among them either the muscular strength or longevity of the Indians or Africans, and still less of the nations of northern Europe. Are the diurnal changes of temperature, to which they are exposed, less favourable to health than the alternation of European seasons, which expose the frame to changes equally great, but less rapid? Or, must we rather look for the cause in their domestic habits, which exhibit a strange mixture of effeminacy and discomfort?

When we examine the social and political effects of climate and localities, we are struck with their powerful effect on the past struggles and present fate of the country. The cities of the coast must be considered as the inlets, both of European products and European ideas. Liberal opinions have extended themselves towards the interior, in proportion to the greater or less facility of communication. It is this circumstance which marks the difference betwixt Venezuela and the South and centre of Colombia, indicating a distinct and more rapid career of civilization and prosperity. The branch of the Andes, which transverses Venezuela, is much inferior in elevation to the ridges of Quito and New Grenada. The whole of the inhabited part of it belongs to the hot country, or temperate mountain zone. The following are the heights of the principal towns through its whole extent:—

	Feet.	Mean temp.
Caracas	2,903	71° Fah.
Valencia.....	1,495	78°
Barquisimeto .	485	78°
Tocayo......	2,058	75°
Truxillo	2,684	75°
Merida......	5,280	66°
Cucuta, about	400	83°

The differences of climate and productions, betwixt the different parts of the

country are consequently trifling, and form no bar to general communication betwixt the coast and interior. There is, therefore, an amalgamation of ideas, an homogenity, if we may use the term, in the mass of feeling and opinions on political subjects. The population is not only more enlightened, but, what is of more importance, more equally so. A different state of things presents itself when we examine the centre and South. The main ridge of the Andes ascends rapidly from the frontier of Venezuela, and by its direction from North to South, places the population at a continually increasing distance from the sea-ports of the Atlantic; while its superior elevation producing a different climate and temperature, gives birth to new habits and a distinct nationality. To descend to the coast from these altitudes, is a matter both of risk and difficulty. The line betwixt the "*Llaneros*" and "*Serranos*" is strongly drawn, and a separation of character evident. The country from Cuenta to Bogotà, through Pamplona and Tunga, has a mean elevation of from eight to ten thousand feet, and temperature of about 59° Fah. It is true that Bogotà communicates with Europe, by the valley of the Magdalena; but the length and inconvenience of this channel of intercourse render it accessible but to few. Hence the struggle of opinions in New Grenada, where the civilization of the superior class is out of proportion with that of the bulk of the people.

The Quitenian Andes afford us another powerful illustration of this view of the subject. The following is the line of elevations betwixt Quito and Chimborazo:

	Feet.	Mean temp.
Quito	9,537	59° Fah.
Latacunga ..	10,285	57°
Ambato	....	61°
Riobamba ..	9,377	57°
Guaranda ..	9,075	58°

The roads, which descend to the coast of the Pacific, are few, almost impassable, and lead to no sea-port of importance, except Guayaquil. Journeys thither, are undertaken with fear and hesitation; and the character of the *Serranos* is marked with all the traits of isolation resulting from the geography of the country.

Next to the direct influence exercised by climate, on the frame of man, we may consider it, relatively to the facility it affords of nourishing him, and advancing his progress in civilization. The most important presents made, by the Old to the New World, are Cattle and *Cerealia*. The only domesticated quadruped known to the Indians was the Llama, which furnished, like the sheep, with thick wool, unwillingly descends, or is propagated in the sultry lowlands. The horned cattle of Europe, on the contrary, have multiplied almost equally on the plains and on the *paramos*. On the farm of Antisana, for instance, at an elevation of from twelve to sixteen thousand feet, there are no less than four thousand head. The herds, raised on the plains of Venezuela, as on the Pampas of Buenos Ayres, are, or were previous to the revolution, almost countless. Two immense magazines of animal food are thus placed, at the two extremes of temperature, in situations uninterfered with by agricultural labour. The horse has been destined to figure in the political changes of the New World. The fear and respect with which he inspired the natives, at the period of the conquest, is well known: they have since multiplied prodigiously in all parts of the country, but more especially in the plains of Venezuela. There, during the war of independence, Paez, and other guerilla chiefs, at the head of an irregular cavalry, and maintained by the cattle, defied the efforts of the Spanish infantry, and kept alive the embers of the revolution.

The best kind of horses are those that are bred in the lowlands, and brought to the mountains, at about four years old, where they acquire hardihood by the influence of a colder climate; and their hoofs, accustomed only to soft pastures, are hardened on a stony soil.

The breed of sheep, like that of Llamas,

is limited to the loftier regions of the Cordillera; while goats multiply more readily on such parts of the low country as are both hot and barren; as in the province of Coro, where they form the chief wealth of the inhabitants.

But while nature facilitates the dispersion, over the globe, of certain species of animals, she seems to limit others by an impassable barrier. The dog undergoes the fate of his European master. His sagacity and strength decay in a hot climate, and the breed dwindles rapidly into an animal totally inferior in habits and organization. The foresters, accordingly, and Indians of the lowlands, who are accustomed to the chase of the wild hog, bring dogs, for the purpose, from the mountains; where, though the Spaniards are by no means curious in this particular, a strong species of greyhound, more or less degenerated, is to be met with, and is used in the highlands for stag-hunting.

The influence of temperature, and consequently of local elevation, on vegetable life, was first examined in Colombia, by a native of Bogotà, the unfortunate and illustrious D. Josè Caldas, who fell a victim to the barbarity of Murillo, in 1811, in consequence of which his numerous researches in Natural History were almost entirely lost, with the exception of some papers, published in the "*Seminario de Bogotà*," in 1808, and fragments still existing in MSS., or casually preserved and printed in Europe. Humboldt travelled through South America, about the same time that Caldas was directing the attention of his countrymen to physical science; and his investigations have, fortunately, been subjected to a less rigorous destiny. His admirable treatise, "*De distributione Plantarum geographica*," has left for future observers little but to corroborate the accuracy of his views, and multiply facts in illustration of his theories.

When we begin our observations from the level of the sea, we find certain families of plants which scarcely ever rise to above three or four hundred feet. The "*Sandalo*," producing the Balsam of Tolu—the *Lecythis*—the *Coccoloba*—the *Bombax*—the *Rhizophora Mangle*—the Manchineel. A second, and more numerous class push on to about two thousand feet of elevation; such are the *Plinia*—the Copal—the *Anime*—the Dragon's Blood—the Mahogany Tree—the Guayacàn—the *Cæsalpinia*—*Ipomæa Quamoclit*—most of the *Bignonias*—*Portlandias*—the *Vanilla*—*Cassia alata*, and *riparia*—the *Pontederiá*, which forms the ornament of tropical rivers. The Palms ascend to the height of five thousand feet. The arborescent Ferns, from the level of the sea, amid the damp forests of Esmeraldas, to seven thousand feet. Of cultivated plants, the Cacao and Indigo are most limited as to elevation, neither of which is cultivated with success at above two thousand feet. An attempt to raise Indigo at Mindo, (three thousand nine hundred and sixty feet) completely failed. It would seem that a dry climate is most favourable to Indigo, such as is found in the valley of Aragua, near Valencia; while heat and moisture, as Humboldt observes, are particularly required for Cacao. Yet, Cacao, cultivated on lands which are flooded part of the year, as is the case with the greater part raised in Guayaquil, is of inferior quality, scarcely producing in the market two dollars and a half per hundred weight. That of Esmeraldas, on the contrary, where, notwithstanding the moisture of the climate, the waters never settle on the soil, is of equal or superior quality to that of the valley of Tuy, near Caraccas. In Camgüe, at an elevation of about one thousand feet, the trees are loaded with fruit in less than two years from the time of sowing the seed; while generally three years is the period at which they are reckoned to commence bearing.

Coffee is abundantly raised from the level of the sea, to elevations of five or six thousand feet, or even higher in favourable situations. There are plantations, near the valley of Baños, in Quito, at about seven thousand feet.

Cotton requires, according to Humboldt, a mean temperature of not less than 64°—

60°, which would bring it to the elevation of Loxa.

The Sugar-cane is cultivated in Colombia, from the level of the sea to an elevation (which may appear extraordinary,) of seven thousand eight hundred and sixty-five feet, in the valley of Baños, at the foot of Tunguragua — of eight thousand five hundred in the valley of Chillo, below Quito—and, of nearly nine thousand feet, near the town of Ambato. It must be observed, however, with respect to the latter, that the "*vegas*" or nooks, formed by the windings of the river, where alone it is raised, are so sheltered as to produce an almost artificial temperature. A Palm tree, brought young from Guayaquil, flourishes there; and "Aguacates," (the fruit of the *Laurus Persea*), ripen perfectly, with Oranges, Limes, and other fruits, which in general, are not cultivated at above six thousand feet. In proportion, however, to the elevation, is the time required, for ripening the Sugar-cane, varying from nine months, at the elevation of one thousand feet, to three years, at the elevation above cited.

Plantains and Maize are the principal articles of food in the lowlands or hot country, "*tierra caliente*," to use the expression of the natives. The large variety of Plantain "*Platano harton*" cannot be cultivated at elevations above three thousand feet; while the smaller variety "*Camburi*," will ascend to six thousand feet. Maize is, perhaps, the plant which, of all others, embraces the greatest variety of temperature and elevation. It is cultivated with equal advantage, from the level of the ocean to the flanks of the Andes, up to eleven thousand feet, temperature 80°—59°. It is true that, in the lowlands, it ripens in three months; whereas on the table-lands of the Andes, it requires ten; but the grain is larger, and the ear fuller, in the cold than in the hot country.

The central, or temperate zone of the Andes, is distinguished by the *Cinchonas*, the arborescent Ferns which precede and accompany the Palms nearly, and in the moist forests of the Pacific, entirely to the level of the sea. At the back of Pichincha, they first appear at about eight thousand five hundred feet. The *Alstræmerias* and *Calceolarias*, peculiar to the New World, are found in this zone, though the former ascend to eleven thousand feet, and the latter to fifteen thousand feet.

The *Cerealia*, with almost all the varieties of European vegetables, belong to this region. Humboldt observes, as a peculiarity, that Wheat is grown near Vittoria, at the elevation of seventeen hundred feet, and, in Cuba, nearly at the level of the sea, (Geogr. Pl. p. 161); but it is probable, that the reason why the *Cerealia* are cultivated only at elevations where the *Musæ* disappear, may be the natural inclination of the inhabitants of a warm country to prefer the cultivation of a plant which yields an equal abundance of food, with infinitely less labour, not only in its mere cultivation, but in the subsequent preparation. The three great Wheat districts in Colombia, are the mountain chain of Merida, the elevation of which rarely reaches five thousand feet, with a general temperature of 72°; the plain of Pamplona, Tunga, and Bogotà — elevation, eight to ten thousand feet — temperature, 58°; and the Quitenian Andes of the same height and temperature. Humboldt has accurately observed, (Geogr. Pl. p. 152), that a comparison betwixt annual mean temperatures of Europe, and the elevated tropical regions, would by no means give a correct state of the climate. Thus, though the mean temperature of the South of France and of Quito be the same, (about 59°), such fruits as Peaches, Apricots, Figs, Pears, and Grapes, which ripen in perfection in the former, although abundantly produced in the latter, never attain their proper size or flavour. The reason is, that the temperature is equal throughout the year. There is, consequently, no period, as in Europe, of summer heat sufficient to ripen fruit requiring, at this season, a mean temperature of 65° or 70°.

[1] Humboldt, who had not visited these forests, confines them to betwixt 800 and 200 hexap.—De Geogr. Pl. p. 185.

As far, however, as the height of seven thousand feet, all kinds of fruit are cultivated with success; and the markets of the colder country are thus constantly supplied from the neighbouring valleys or "*Calientes*." Humboldt is mistaken in supposing the *Olive* to be always barren, (semper sterilis manet. p. 154). On the Quitenian Andes, near Ambato, it produces abundantly, though little attention is paid to its culture.

When we ascend above the extreme limit of cultivation, which may be placed at eleven thousand five hundred feet, and pass the region of the *Barnadesiæ, Hyperica, Thibaudiæ, Gaultheriæ, Buddleeæ,* and other coriaceous-leaved shrubs, which, at this elevation, form thickets of perpetual bloom and verdure, we enter the region of *paramos,* (thirteen to fifteen thousand feet), properly so called, which presents to the eye unvaried deserts—clothed with long grass — constituting the pasture ground of the Andes. Humboldt is inclined to fix, below this region, the limit of forest-trees (Geogr. Pl. p. 148); and, in fact, very few are generally met with, near this elevation, on the flanks of the Cordillera, which join the inhabited table-lands. But I have observed on crossing the side of Pichincha, towards the uninhabited forests of Esmeraldas, that the forests cover nearly the whole space which, on the eastern slope, is a naked *paramo.* Is this owing to a difference of climate, or has the practice, universal in the Andes, of burning the paramos, together with the demand for fire-wood in the vicinity of large towns, contributed to give this region the bare aspect it has at present? Further observations on the mountain slopes, towards Maynas and Macas, are necessary to throw light on this point. It is certain, from the present aspect of the inhabited plain of Quito, where we meet with a few scattered trees of *Arroyan, (Myrtus)*, and artificial plantations of Capuli, *(Prunus salicifolia)*, we should conclude that the region of forests had scarcely ascended to the height of eight thousand feet; yet, some of the houses of Quito are still standing, built of timber cut on the spot.

A circumstance, which cannot have escaped the notice of those who have ascended towards the limit of perpetual snow, is the variety and luxuriance of the Flora, at the very point where the powers of vegetation are on the brink of total suspension. At above fifteen thousand feet, the ground is covered with *Gentianas,* purple, azure, and scarlet; the *Drabas;* the *Alchemillas;* the *Culcitium rufescens,* with its woolly hood; the rich *Ranunculus Gusmanni;* the *Lupinus nanus,* with its cones of blue flowers enveloped in white down; the *Sida Pichinchensis* spotting the ground with purple; the *Chuquiraga insignis;*[1] all limited within a zone of about five hundred feet, from whence they seem scarcely to be separable by any effort at artificial cultivation. Several attempts which I have made to raise the *Gentians, Sida,* and other plants, of the summits of the Andes, at the height of Quito, have been invariably unsuccessful. The attempts, indeed, to domesticate plants in a situation less elevated, is attended with greater difficulties than the transport of plants from one climate to another. Besides the difference of atmospheric pressure, as Humboldt has observed, plants transferred from one elevation to another, never meet, for a single day, with the mean temperature to which they have been accustomed; whereas, transferred from one latitude to another, the difference is rather in its duration than in its intensity. It is easier to accustom a plant of the lowlands to this elevation, than to bring down those of the *paramos.* Thus, the Orange and Lemon trees, Aguacates (*Laurus Persea*), *Ricinus communis, Datura arborea*—all natives of hot lowlands, grow and flourish more or less, at an elevation of eight thousand feet above the level of the sea.

Quito, April 15, 1835.

[1] The other plants that occur on the sandy crater of Riobamba, are *Cerastium densum, Astragalus geminiflorus, Culcitium nivale* and *reflexum, Aster rupestre* and two or three *Gramina.*

ILLUSTRATIONS OF INDIAN BOTANY.

By Dr. Wight & G. A. W. Arnott, Esq.

(*Continued from p.* 82.)

POLYCARPÆA SPADICEA.

TAB. VI.

PENTANDRIA MONOGYNIA.—Nat. Ord. PARONYCHIEÆ.

GEN. CHAR. *Calyx,* 5-partitus aut profunde 5-fidus; sepalis planiusculis, margine membranaceis nec carinatis nec mucronatis. *Petata* 5, et *Stamina* 5, fere hypogyna. *Stylus* conicus, filiformis. *Stigmata* 3. *Capsula* unilocularis, trigona, trivalvis, polysperma. *Semina* placentæ centrali affixa. — Herbæ *aut* suffrutices, *sæpius valde ramosi.* Folia *opposita sed ex ramis axillaribus brevissimis foliosis pseudo-verticillata.* Stipulæ *scariosæ.* Flores *cymoso-corymbosi, ext. albo-virescentes.*

Polycarpæa *spadicea;* suffruticosa, caulibus diffusis valde ramosis ramisque tomentosis, foliis oblongo-lanceolatis vel linearibus, vel rarius setaceis obtusiusculis, vel acutis mucronatisve junioribus subtomentosis, cymis terminalibus corymbosis, sepalis omnino scariosis lanceolatis acuminatis capsula duplove triplove longioribus. *W. & A. Lam. Ill. n.* 2799. *De Cand. Prodr. v.* 3. *p.* 374. —*Achyranthes corymbosa, Willd.? Sp. Pl. v.* 1. *p.* 1200.—*Mollia corymbosa, Willd.? Hort. Berol. Spr. Syst. Veg. v.* 1. *p.* 795. — *Lahaya corymbosa, Schult.? Syst. Veg. v.* 5. *p.* 405.— *Polia arenaria, Lour. Cochin. (ed. Willd.) v.* 1. *p.* 201.—*var. α.*; foliis oblongo-lanceolatis obtusiusculis, corymbis densifloris. *Wight, Cat. n.* 1168.— *Polycarpæa spadicea, Wall. List, n.* 1512. *b.* (*a.* nobis non visa).—*var. β.*; foliis approximatis oblongo-linearibus stipulas superantibus inferioribus subacutis superioribus mucronatis, corymbis densifloris. *Wight, Cat. n.* 1169.—*var. γ.*; foliis oblongo-linearibus obtusiusculis vel subacutis plus minusve distantibus, corymbis subdensis vel laxis. *Wight, Cat. n.* 1170.—*Polycarpæa densiflora. Wall. List, n.* 1513. (partim.) —*Rheede, Mal. v.* 10. *t.* 66. TAB. nostr.—*var. δ.* ramis gracilibus — foliis setaceis mucronatis, corymbis laxis teneribus. *Wight, Cat. n.* 1171.—*P. subulata, De Cand.? in Lam. Encycl. Meth. v.* 5. *p.* 25.

DESCR. *Root* perennial, woody; *stems* numerous, diffuse and often prostrate, branched, tomentose. *Leaves* opposite, from shortly oblong and slightly obtuse to long, linear and somewhat acute; when young, tomentose, when old, becoming glabrous; usually there is a tuft of young leaves, or an abortive branch in the axils of the proper leaves, so that they appear verticillate. *Stipules* membranous and scariose, very thin and shining, small, lanceolate, acuminated, glabrous. *Flowers* terminal, cymose or corymbose. *Calyx* whitish, scariose and shining, five-partite; segments lanceolate, much acuminated. *Petals* five, reddish, narrow, obovate, slightly emargimate at the apex, alternate with the segments of the calyx and not half so long, nearly hypogynous. *Stamens* five, alternate with the petals, and inserted with them, opposite to the sepals, scarcely so long as the petals. *Anthers* roundish, two-celled. *Ovary* ovate, free from the calyx, containing about three or four perfect seeds, with the remains of several others, all attached to a central free placenta. *Seeds* oblong, rugulose; *Albumen* mealy. *Embryo* cylindrical, curved. *Radicle* pointing to the hilum. *Cotyledons* two, small.

Common on the most arid soils, and in flower at all seasons of the year. As a species, this can scarcely be said to differ from *P. corymbosa;* the extremes are no doubt very dissimilar, but the accompanying figure tends to unite the two. We have some varieties of the present, with the leaves almost oval and short, while in the usual state of *P. corymbosa,* they are often subulate. Rheede's figure, above quoted, is exceedingly ill executed. Our very few specimens of the *variety δ.* present two forms, one a first year's growth, with the root the same as that of an annual, and the stem erect, but dichoto-

mously branched; in the other, the root is at least two years old, and the stems diffuse, as in our specific character: of both, the leaves and whole habit are as slender as in the specimen of *P. corymbosa*, (*Wall. List, n.* 1511. *c.*) from Prome. This variety is therefore intermediate between *P. spadicea* and *P. corymbosa*, and seems almost to unite the two species: we have, however, referred it to the former, as the first-year's growth of a perennial or suffrutescent plant, cannot adequately display its true appearance. Dr. Wallich's *P. densiflora* is composed, not only of our *var.* γ. here figured, but also of *P. corymbosa*; both occur promiscuously under the same letters. It is almost impossible to extricate satisfactorily the confused synonyms of Willdenow, Schultes, and Sprengel, from their characters being partly compounded of their own observations, and partly of the description given by others of probably a different species: upon the whole, however, we consider these Botanists to have applied the name *spadicea*, to the Linnæan *corymbosa*,—and *vice versa*. De Candolle's definition is quite distinct, though not sufficiently comprehensive, from the defective suite of specimens he must have examined.

Fig. 1. Cluster of Flowers. 2. 3. Single Flowers. 4. Capsule cut open:—*magnified.*

POLYGALA JAVANA.

TAB. VII.

Suffruticosa diffusa molliter pubescens vel subtomentosa, ramis inferne teretibus superne angulatis, foliis oblongo-obovatis obtusis vel retusis cum mucronulo basi cuneatis breviter petiolatis, racemis suboppositifoliis multifloris demum fere duplo superantibus, bracteolis minutis persistentibus, alis late ovatis mucronulatis membranaceis molliter pubescentibus capsula dimidio longioribus atque latioribus, carina cristata, capsula orbiculari subæquali emarginata leviter marginata ad marginem præcipue molliter pubescenti.

Polygala Javana, *De Cand. Prod. v.* 1. *p.* 327. *Spr. Syst. Veg. v.* 3. *p.* 164. *Wight, Cat. n.* 139.

Polygala Ceylana, *Heyne in Wall. List, n.* 4183.

Suffrutescent. *Branches* long, slightly branched, diffuse, terete below, angled towards the extremity, covered, as well as the leaves and the other parts of the plant, with much soft pubescence, or as it may be called short tomentum. *Leaves* scattered, cuneate-oblong or obovate, obtuse or slightly retuse, mucronulate. *Petioles* very short. *Racemes* lateral, on the opposite side from a leaf and a little above it, at first short, afterwards elongating to almost twice the length of the nearest leaves. *Bracteas* and *bracteoles* persistent, small, ovate, pointed. *Flowers* pedicelled, the lower ones in each raceme often caducous. *Calyx* irregular: sepals five; the two lowest the smallest, oblong, herbaceous; the uppermost a little larger, but similar to the lower ones: the lateral ones, or *alæ*, are roundish-ovate, acute, membranaceous, pale yellowish-brown, veined, softly pubescent. *Corolla* scarcely coloured, irregular: *petals* three; the two upper inserted between the alæ and the upper sepal, oblong-lanceolate, with a short bent back spur on the margin, about the middle; the lowest one cucullate, spurred on each side below the middle, bearing below the apex on its back a large lobed and multifid crest, of a fine red colour. *Stamens* eight, united into a sheath that adheres with the claws of the petals; *filaments* distinct at the apex. *Anthers* one-celled, opening by a terminal pore. *Ovary* free from the calyx, compressed, pubescent, two-celled, the one cell opposite to the upper sepal, the other between the two lowest sepals: *Ovules* solitary in each cell, pendulous; *Style* simple, curved. *Capsule* two-celled, two-seeded, opening at each margin, and hence loculicidal, nearly orbicular, emarginate, with a slight margin, and there principally pubescent; sometimes it is a little oblique, sometimes equal-sided.

This is most allied to some of the Cape species of the genus in its large flowers and alæ. I have not seen De Candolle's

specimens, but can perceive no difference of any consequence between the character given by him and that by Mr. Arnott and myself: Dr. Wallich, however, seems to think differently. I hope that the accompanying figure will enable some one who possesses the Java plant, to ascertain positively whether it be ours, and if distinct, to point out the difference.

Fig. 1. Flower. 2. Capsule. 3. Capsule laid open. 1. 3.—*magnified.*

BOTANICAL INFORMATION.

(Continued from p. 86.)

In the Botanical Journal, p. 179, we communicated the information, that Mr. Schomburgk, an excellent Botanist, who had been long resident in the West Indies, was about to explore the banks of the Orinoco, under the patronage of the Royal Geographical Society of London. Intelligence has just been received from him, bearing date Georgetown, Demerara, Aug. 7, 1835, at which place he had arrived only two days previously, and where he was engaged in making preparations for this important expedition. The rainy season, however, upon the coast, had been of unusual length this year, so that he did not deem it advisable to penetrate into the interior before the commencement of September. His Excellency the Governor, Sir J. C. Smyth, had taken a lively interest in the expedition, and there was a prospect of Mr. Schomburgk's having a scientific companion, who had volunteered to join the party.

We hear, with much pleasure, that Dr. Graham, of Edinburgh, while on a botanizing excursion in Galloway, accompanied by some of his students, discovered the *Ononis reclinata* in considerable abundance. This is a most valuable addition to the British Flora.

The rare and remarkable form of *Pedicularis sylvatica*, having a regular corolla, with *five* divisions and *five* spreading stamens, has lately been found by Miss Bage, of Bangor, near the village of Hanwood, four miles from Shrewsbury.

POEPPIG AND ENDLICHER'S PLANTS OF SOUTH AMERICA.

The first Decade of Poeppig and Endlicher's *Nova Genera ac Species Plantarum quas in Regno Chilensi Peruviano et in terra Amazonica annis* 1827 *ad* 1832 *legit Eduardus Poeppig,* has just reached us; and as far as can be judged from the first *Fasciculus,* it promises to be a most valuable addition to our botanical libraries. The size is folio; the plates are executed in outline with the greatest care, and the descriptions are full and satisfactory. The subjects of the present number are highly interesting, particularly those of the three first plates, which are admirably illustrative of the curious genus *Misodendron* of Banks's MSS., belonging to the Nat. Ord. *Loranthecæ,* and exclusively inhabiting the colder extra-tropical parts of South America. The species figured and described are, *M. lineare,* D C., *M. oblongifolium,* D C., and *M. imbricatum,* Poep. and Endl. The fourth to the seventh plates are devoted to as many species of *Ourisia* of Commerson; *O. Magellanica,* Juss., *O. coccinea,* Pers., *(Dichroma, Cav.), O. pallens,* Poep. and Endl., *O. alpina,* Poep. and Endl., *O. microphylla,* Poep. and Endl., and a sixth species is described, *O. polyantha.* The eighth plate is *Sphyrospermum buxifolium,* Poep. and Endl., of the Peruvian Andes, a new genus of *Vaccinieæ;* the ninth, *Thibaudia secundiflora,* and the tenth, *Ceratostemma biflorum,* Poep. and Endl.

Dr. Poeppig, in another place (Froriep's Notizen), gives the following brief but animated picture of the Natural History of Chili, a country where he has collected so many of the interesting plants which will occupy the pages of the "Nova Genera," &c.—

"Chili is in reality neither that terrestrial Paradise which Molina, in his excessive patriotism, has described it to be, nor on the other hand, is it such an arid and desolate mountain-region, as is pictured by Mino. Whoever is only acquainted with the northern part of Chili, must refrain from passing any judgment, because the environs

of Valparaiso are dreary, and the vegetation at Santiago is forced. The climate deserves all the praise that Molina has lavished upon it: the splendour of the summer, the mildness of the winter, and the indescribably lovely prospects which prevail throughout Chili, render travelling here incomparably more delightful than any where else throughout South America. The sky is here as brilliant as in the tropical districts, and there are none whatever of those pests that embitter life there, neither insalubrious air, nor pestilential disorders, nor oppressive heat, nor swarms of tormenting insects. Every Naturalist may, on the contrary, reckon upon enjoying the glories of nature in the freest and most cheerful manner. Civilization has greatly increased in Chili since the cessation of Spanish mis-rule, and now exists to a greater extent than in any other part of this vast continent; while trade and prosperity are daily augmenting. The intestine broils, which succeeded the Revolution, have ceased, and the inhabitants become daily more sensible of the value of peace, and more desirous of preserving it. The abundant opportunities for commercial prosperity which this country possesses, together with the industrious disposition of its inhabitants, will soon raise it to a greater degree of influence than Peru or Colombia can hope to attain. For the Naturalist, there here exists an abundant harvest to be discovered and described, and from the partial information that we have been able to collect respecting its Geology, the votary of this science may find employment for many years. The most interesting part of the Andes is situated in the Indian country (southward from lat. 37°); but no security can be expected while travelling in that district, so long as Pincheira and some other old Spaniards continue to reside there. The volcano of Antuco alone is visited by strangers; but the other far more interesting portions of these mountains yet remain unexplored. A geological survey of the mountains of Pehuenchin, easterly from Antuco, might be expected to afford very valuable results, as the plains are surrounded by large mountains of rock-salt, and some very large lakes of Asphaltum. Here there are springs that periodically eject boiling water, and bare plains, where, according to the report of the Indians, fire may always be procured, by setting fire to a stream of gas, that issues out by thrusting a lance deep into the ground. The Botanist may expect a rich reward for his labour, if he does not regard the toil of travelling through these unexplored districts. The environs of Valparaiso and Concepcion may be probably exhausted, partly because they are poorer, and partly because almost every expedition that goes round Cape Horn, touches in its way at one or other of these places; but the more distant Andes afford in the greatest abundance new and very rare plants, which no Naturalist has yet seen. Although the environs of Coquimbo and Copiapo are dreadfully dry during summer, yet in the rainy season and beginning of spring (from June to October) they are covered with a profusion of beautiful though fugacious plants. The Flora of the Andes has hitherto only been explored at one single and rather barren point, along the way from Santa Rosa to Mendoza, where some Englishmen have made collections, without being themselves Botanists, for the sake of sending them to Hooker and other writers on the subject. Throughout the whole long tract to the Biobis, no Botanist has ever ventured far from the coast. The Flora of the Southern Andes, only taking a little circle of from three to six geographical miles about Antuco, is a proof what discoveries might be expected from an examination of that mighty chain, the Andes, in its full extent. Those alpine meadows exceed in verdure and abundance of plants the most celebrated stations in Carinthia, Tyrol, and Switzerland, and are like a new world to those who are only acquainted with the North of Chili. On the other side of the Biobis the country is still richer; and the district exactly lying between Concepcion and Chiloë, that is at the sea, and on the loftiest Andes, is the very spot which a Botanist should select as his station, and

where he might, perhaps, in a couple of summers, double all the plants hitherto known as natives of Chili. The unexplored Archipelago of Chili merits the greatest attention, and would, perhaps, by itself, repay the sending out a traveller, but the central provinces have been so well examined, and during half of every year are so dry, that they would never reward one who visited them with the sole view of studying their botanical productions.

"In comparison with other countries, possessed of an equally favourable climate, the Northern part of Chili is very poor in animal life. *Insects* are scarcely seen; of *Mammalia* there are only some of the smaller *Rodentia*, or gnawing kinds; and *Birds*, though more numerous, are still comparatively few. But south of the Monte, the general aspect of the country alters strikingly in this respect; and on the lower districts of the coast, the birds are just as abundant as on the mountains they are scarce; while the immense swarms which resort to the Archipelago of Chiloë would afford almost interminable employment to the Ornithologist. The coast of Concepcion and vicinity of Talcahuana are exceedingly rich in marine animals of the lower tribes, and the winter might be profitably spent by an experienced person in examining them."

The Author adds, that "every traveller quits Chili with reluctance, especially on account of the higher character of the natives for moral excellence than is found among the inhabitants of any of the other Spanish colonies; and that this oft-named Naples of America equally excels the other parts, in its beauty and agreeableness as a residence."

DESCRIPTION OF MALAYAN PLANTS.

By William Jack.

With a brief Memoir of the Author, and Extracts from his Correspondence.

To the European Botanist the name of William Jack is at present scarcely known; but no one can have directed his attention and studies to the Flora of Southern India, especially if he had the opportunity of consulting the "*Malayan Miscellanies,*" a very rare work, published at the Sumatran Mission press, at Bencoolen, without finding how much the Flora of India is indebted to the learning and indefatigable researches of that gentleman. Nor was he remarkable for these qualities alone, calculated as they are to entitle him to the consideration and esteem of every man of science. Dr. Wallich says, in a note at vol. i. p. 202, of the *Flora Indica,* published at Serampore in 1824, when alluding to some new plants discovered in the Malay Islands, by Mr. William Jack:—"I was in hopes of meeting again with this most zealous naturalist at Singapore, last year, when I was obliged to visit that island, on account of a severe fever which I had contracted on my way down to the plains from Nipal. But it was otherwise ordained; and I have now to claim the sympathy of the reader, while I indulge a moment in rendering a feeble tribute of respect and friendship to his memory, leaving it to the pen of Sir Stamford Raffles, the revered friend and patron of us both, to do it far ampler justice. During Mr. Jack's short and unostentatious, but highly useful and meritorious career, his comprehensive mind extended to every branch, almost of moral and physical science, with a degree of success, which the world has ample opportunities of appreciating, from his numerous valuable contributions to the common stock of information, both printed and manuscript. To his family and friends, the loss of such a man is indeed irreparable; nor can it be replaced to the public, but by an equally fortunate combination of first-rate talents, with the utmost suavity of temper and urbanity of manners." In the same volume, Dr. Wallich dedicated a "very large branchy and umbrageous forest tree,"[1] a native of these small islands, in the vicinity of Sincapore, of the natural order *Ru-*

[1] Of this beautiful tree, with its ample foliage and large panicle of flowers, Dr. Wallich has given a figure in his splendid "Plantæ Rariores Asiaticæ," t. 293.

biaceæ, to the subject of our memoir, under the name of *Jackia ornata*, and there further remarked, "I have dedicated this new genus to the memory of my departed friend, the late William Jack, whose premature loss I have already adverted to above, and whose well-known indefatigable labours in Natural History, have long ago entitled him to the highest respect. It was the amiable modesty of his character, and not any neglect on my part, which prevented me from executing my design of naming a plant after that excellent botanist during his life-time."

It was Dr. Wallich, again, who suggested to me the propriety of republishing in my "*Botanical Miscellany*," Mr. Jack's botanical papers, from the "*Malayan Miscellanies*," so that they might be rendered available to the student of Indian plants in Europe; and the kindness of that friend having supplied me with the necessary volumes, I commenced the reprint of them in a series of papers in that work, and in the "*Botanical Journal*," and propose here to conclude them. But it was impossible for me to do this without wishing to know something more of the history of the lamented author, and without desiring also that the scientific public should benefit by such knowledge. The Rev. Dr. Fleming, late of Flisk, and now the professor of Natural Philosophy, in King's College, Aberdeen, whose services rendered to the cause of Natural History need no eulogium from my pen, at the request of a mutual friend, made known my wishes to his parents, the Rev. Dr. Jack, principal of King's College, Aberdeen, and Mrs. Jack, who not only most obligingly communicated a large portion of his letters, permitting me to use such of them as I might think necessary; but, what is far more valuable, Mrs. Jack kindly undertook to draw up a brief notice of his earlier career, to which his letters bear no reference. It will presently be seen, that all his MSS. and papers, which were to have been brought home by Sir Stamford Raffles, were destroyed in the ship Fame, by that disastrous fire, which is so feelingly described by Lady Raffles, in her faithful and affectionate memoirs of her husband. Thus circumstanced, and not having had the happiness of any personal acquaintance with Mr. Jack, I must necessarily confine myself to the little memoir communicated by the accomplished lady, his mother, extracts from his letters after quitting home, and some of the many testimonials to his character, written by those who had frequent intercourse with him, and who had the best means of forming a due estimate of his virtues and his attainments in literature and science. It is deeply to be regretted, that his papers were not preserved, and that Sir Stamford Raffles did not live to fulfil his intentions of giving to the world a life of Mr. Jack, which would, indeed, have rendered ample justice to his memory, and have superseded the present brief sketch, the chief object of which, is to serve as a memorial of his botanical acquirements, and his many and estimable qualities.

William Jack, son of Dr. William Jack, principal of Aberdeen, was born at King's College, in that city, on the 29th of January, 1795. He showed uncommon intelligence from his early infancy, and learned almost insensibly to read, so that at three years old, he could read fluently, with perfect understanding. When about five years of age, he attended an eminent teacher of elocution, who was so much astonished and pleased at the uncommon proficiency of his youthful pupil, that he insisted on his exhibiting at one of the public recitations, where the child delivered with much propriety of utterance and action, Pitt's celebrated reply to Horace Walpole. His memory was so quick and retentive, that he seldom, in the course of his early studies, needed to go twice over the same lesson; yet, that he might be well-grounded, he proceeded twice through the Latin rudiments at home, and at six years of age, entered a class at the grammar school, along with boys several years older than himself, and who had studied longer. Here, he immediately took the

lead, and almost constantly kept at the top of the class, his accuracy and attention being such as to give him a decided superiority over his compeers, one of whom in particular, possessed great natural powers, added to a strong spirit of emulation, a sentiment which the simplicity and mildness of young Jack's nature prevented his entering into, or even comprehending. When, at a later period, his rival, urged to extraordinary exertion, sometimes succeeded attaining the highest place, and it was endeavoured to stimulate the subject of our memoir by similar motives, he mildly answered, "I shall do my best, and if he can do better, why should he not?" His progress in Latin may be judged by the fact, that he not only read Virgil fluently, but translated several passages of the Eclogues into English verse, at nine years of age. Without any remission of ardour in his classical studies, he soon after commenced the study of Botany, and of the French language, in both of which he made great and rapid progress: the former was his amusement and pleasure, in which he was kindly assisted by the amiable and respectable professor of Natural Philosophy, Mr. Duncan, a man whose refined and congenial mind, enabled him to detect in the promise of the bud, the future beauty and excellence of the blossom. This worthy person loved and esteemed his young pupil, and encouraged his taste for the study of plants, in which he was his only instructor, for it was not until he became himself a master in the science, at least with respect to British Botany, that young Jack had ever attended any lectures on the subject. His kind instructor farther recommended to his attention, Lee's Elements of Botany, and sending him into the fields to seek for plants, taught him to compare the specimens with the descriptions in the *Genera Plantarum* of Linnæus, and in Lightfoot's *Flora Scotica ;* a last appeal, in cases of difficulty, being permitted to his accomplished master. He also preserved the specimens, with the names and characters carefully attached. This collection, consisting of several hundred well dried plants, having been accidentally destroyed, he determined to represent in colours some of the most striking of our native productions, and accordingly, without any instruction in the art, boldly commenced filling a volume, which, though not perhaps executed in the best style of design, has yet been commended by scientific Botanists for the extreme accuracy of its representations. It was not his fondness for the art of drawing that led him thus to employ his time, but his desire to perpetuate those wonders of nature in which he delighted: he was so keenly alive to beauty of form and colour, that they left an indelible impression on his mind, so that he never forgot a plant which he had once seen, and a single leaf of it even would recall the whole of its characters to his remembrance.

The classical education of William Jack was conducted by Mr. M'Lachlan, an excellent scholar, then head master of the Grammar School in Old Aberdeen; while there, he maintained his pre-eminence in the class over many talented lads of superior age; and when twelve years old, had made so much progress, that his master declared him to be fit to enter the Greek class at King's College. Having attended the lectures on Greek and Mathematics during the two next sessions, he commenced the study of Medicine at fourteen, and was admitted a member of the Juvenile Medical Society, after a strict examination. Though zealous in the pursuit of Medical knowledge as his future profession, yet his mind was more bent on acquiring general information, and thence he applied with great alacrity to Natural Philosophy, which formed the subject of the third College Session, making drawings of all those models of machinery which illustrate the mechanical principles.

Having completed his college career, and taken the degree of M.A. at the age of sixteen, this youth was prevented by an attack of scarlet fever from proceeding to Edinburgh to prosecute his medical education, and spent the winter at home, during which time his excellent friend,

Professor Duncan, having been struck with paralysis, his young pupil supplied his place, and taught the classes with entire credit, until a suitable assistant could be found to relieve him of a charge which interfered too much with his private studies and pursuits. After being released from that duty, the subject of this little memoir attended a class for Chemistry, and took notes of the lectures on the French tongue, making himself a perfect master of that language, as well as of Italian and Spanish. He also attended the Divinity Class, taught by Dr. G. Gerrard, but without any further ulterior views than the general information which it conveyed.

Botany had long been his favourite pursuit in summer, and he was the frequent companion of Dr. Beattie and Dr. Knight in their herborizing rambles, as well as making wider excursions with more youthful companions. Well qualified judges declared him to be among the best botanists, chemists, and classical scholars in Scotland, when he left this country for London, in October 1811, before completing his seventeenth year!

While in London, he continued to pursue his medical and botanical studies with unwearied perseverance, cultivating, at the same time, the friendship of men of learning, who kindly condescended to encourage the rising genius of a youth, whose talents and modesty were alike conspicuous. Among these were Sir Joseph Banks, his librarian and friend, the celebrated Robert Brown, Mr. G. Anderson, a well-known Botanist, son of Dr. Anderson, the Editor of the Bee, &c. and at that time one of the Council of the Linnæan Society; also, and in particular, Sir Vicary Gibbs, who on intimate acquaintance, declared that he never had met with any youth, possessing such solid and varied acquirements.

The object of young Mr. Jack in going to London was, to attend the hospitals and the lectures in the different departments of Medicine and Surgery, then to present himself as a candidate for examination at Surgeons' Hall, and afterwards to obtain the situation of surgeon in one of the East India Company's ships, in order to improve himself in the practice of his profession, and also to extend his knowledge of Natural History, until he should attain the age requisite for holding an appointment on that Establishment.

With a noble independence of mind, he was willing to content himself with a humble station, where his own exertions might recommend him, rather than seek to rise by the too common means of sycophancy and solicitation. Several of his friends, aware of his merits, and perceiving the great promise of his talents, were kindly anxious to promote his views, and his examination was hurried on, that he might embark in one of the first ships of the season. The following account of his having passed as Fellow of the Royal College of Surgeons, with their highest diploma, is not without interest, as showing the opinion of unprejudiced judges respecting his talents and acquirements.

London, Feb. 1, 1812. "Yesterday I passed as Fellow of the College of Surgeons, and with flying colours. Five days were all I had, in which to prepare and go through the previous business. I appeared before my examiners with all the courage I could muster, and having evaded in the best way that I could, the demand for a certificate of age, they agreed, after a little consultation, to examine me. Sir William Blizard questioned me, and as it was an extraordinary meeting, the whole Court were judges. My trial was short, and they seemed so well pleased with my replies, that Sir William Blizard said it was unnecessary to put any more questions, as it was evident I understood my subject. Sir James Earle agreed, and obligingly declared that not one in five hundred would answer so accurately. I retired for a while, and when I returned, the Master put a few questions as to my period of study, &c. I offered to produce my certificate of apprenticeship, but he said, that as I had answered so perfectly, the Court did not require it, and informed me that I had passed. They then congratulated me on my success; one observed that I should be an honour to the

Company's Service, and paid me such compliments as modesty forbids me to repeat."

Upon this substantial proof of young Jack's abilities, his excellent friends, Sir Vicary and Lady Gibbs lent all their influence to obtain an immediate appointment in the Bengal Establishment, and succeeded in procuring for him the first of the season: but he could not be persuaded to quit his native land without seeing again his parents, brothers, and sisters, to all of whom he was most fondly attached. He accordingly (with the consent of his friends) embarked for the North, and spent eight months at home, endeared to his family by every tie that amiability, added to affection and the claims of nature, can twine around the heart.

In the next winter he returned to London, and attended another course of lectures, at the conclusion of which his friends, by exerting double interest in his favour, succeeded in procuring for him an appointment similar to that of the former year. He embarked accordingly for India, on board the Company's Ship "Baring," on his birth-day, 29th January, 1813, aged eighteen years.

Of Mr. Jack's future active, but brief career, his correspondence and published works form the only memoranda. All his papers, the result and record of much research, both in Natural History and in Oriental Literature and Civil History, were lost by the burning of the Ship Fame, in which his friend Sir Stamford Raffles and family had embarked for Europe. Sir Stamford Raffles, anxious to do justice to the memory of Mr. Jack, had determined to publish a short memoir, drawn only from his own acquaintance with the character and talents of his lamented friend, whom he had the best means of knowing, as they had lived together for four years on the most intimate and confidential terms: but this design was defeated by the sudden and premature close of Sir Stamford's own life, in July, 1826."

The following extracts from letters which Mr. Jack wrote to his family in Scotland, after sailing for Bengal, will give some idea of his attachment to Natural History, and to Botany in particular, as well as of his ardent thirst after knowledge.

Feb. 28th, 1813. "This morning early we were off Funchal, the principal town of Madeira, and in the forenoon a boat came alongside, in which most of the passengers and myself went on shore. After strolling about the station, I quitted my companions and followed the course of a stream up the country, where, though pleased at seeing numbers of new plants, I was more gratified by observing many of those of our native country, as the *Broom*, *Galium montanum*, &c. *Lupines* were growing as a weed, and great quantities of *Bamboos* fringed the sides of the stream with several species of *Palm*, which I have seen cultivated in hot-houses in England, and a singular plant, sometimes grown in pots, with broad thick fleshy leaves that spring out of one another in succession, so that there is no stalk; this last was plentiful upon the rocks. The island is very rough and uneven, but the soil, where there is any, is a fine loam. Grapes were not in season, but I saw their stalks every where, trained to a kind of espalier, made of poles, and crossed at top with bamboos. The vineyards occupied every ledge of the rocks where there was any earth for them, rising, terrace above terrace, to the top of the hill. The Oranges were the principal fruit in season, and they hung thick among the branches; I also observed several woods of Scotch Fir, but whether native or introduced, I am not aware."

Symon's Bay, Cape of Good Hope, May 3rd, 1813. "Yesterday morning we came to anchor in Symon's Bay. The prospect around is exceedingly bleak, bare, and rocky; hills rising above hills from the water's edge, whose sides present nothing to the eye but stones and brown heather, while in other parts, wastes of white sand, still more barren, dazzle the sight. Symon's Town consists of a few white houses, built along the shore, at the foot of a steep hill. The ground around it scarcely presents any appearance of cultivation, except

a few shrubs and small trees, planted about some of the dwellings—indeed it is hardly possible to improve so impracticable a soil. The surgeon and I went on shore, when after amusing ourselves with looking at the houses and their inhabitants, who are mostly Dutch or Portuguese, we took a trip into the country. The first plants which attracted our notice, were several species of Fig-marigold (*Mesembryanthemum*). We ascended a hill by the side of a deep ravine, and proceeded as far as we thought safe among the broken precipices, for it became terribly ragged and bare. The ground was covered with small shrubs, all of which were new to me, and some very beautiful; the glaucous-leaved *Leucadendron* was abundant. I reaped a rich harvest of new plants, but have not yet had time to ascertain them all. There is a great variety of the species of *Oxalis* here, and I have already determined four; but I have not found nearly so many *Heaths* as I expected. Land-Tortoises are common; Penguins, Albatrosses, and Pintados are among the most remarkable birds which I have observed. You have heard of the large tails of the Cape Sheep, but I think the accounts of these must have been very much exaggerated, as the common weight is only from seven to twelve pounds."

Symon's Bay, May 22, 1813.—"I wrote to you soon after our arrival here, where we have now spent a fortnight, a period much longer than we either expected or wished. We are to sail to-morrow, and as no other opportunity of writing may occur for some time, I avail myself of the present, to say that I continue well, and to give you some account of this place. I have been on shore almost every day since our arrival, and have taken some long walks into the country, but have not gone to Cape Town, as I found sufficient employment here, and such an excursion would have been very expensive. The barrenness of the country, which I mentioned before, does not diminish on farther inspection. In a botanical point of view, however, it is very rich, and every hour which I could command, has had full occupation in examining plants, which are very varied and all new to me; my only old acquaintance being the *Arum* and *Spergula arvensis*. The hills almost resemble English shrubberies or pleasure grounds, where bushes and plants of every kind unite to gratify the eye and smell. They are still farther enlivened by numbers of small birds of various and brilliant plumage, among which are some resembling humming-birds. The weather has been delightful ever since we arrived.

"A few days ago, we made an expedition to the top of Table Mountain, about sixteen miles distant. Our party, which consisted of five officers and passengers of the ship, besides myself, were well provided with ammunition and provisions, and we took our course over the hills, regardless of roads, with a view of seeing the country better, and as we thought, of shortening the way. We traversed a great diversity of ground, sometimes over wastes of fine white sand, which rose and sunk in ridges, like wreaths of snow, sometimes through thick and tangled brushwood, which covered the valleys, and again over rocky and precipitous hills. In the afternoon, upon gaining an eminence, from which we had a full view of the country, we found ourselves still so distant from the mountain, as to preclude the possibility of climbing it that day. Upon this, we held a council of war, when my companions, unused to such travelling, weary and discouraged, proposed making the best of our way back to the ships: a plan, which you may be sure was opposed by me, as well as by the second mate, who was of the party; but our rhetoric was in vain, The others being tired, we all sat down to refresh ourselves with a bottle of brandy, which we had brought, and we purposely allowed them to waste the time, till it began to grow dusk. As surrounding objects began to grow indistinct, the mountain appeared as if quite near, and as my companions recovered their spirits, I again urged the staying till next day, and represented that we should return too late to

go on board the ships that night, so that at last I carried my point. The next question was where we should sleep, and we started to look for some building where we might put up, and find a shelter, though it should be only a barn. During our search, it became quite dark, and after walking some hours, what place should we stumble upon but the well-known Constantia! Thence we were directed to a sort of inn, some miles distant, where we got a good supper, and all tumbled together into a bed, spread on the floor. In the morning, we climbed the mountain, which is very steep and scarcely ever ascended on this side. We however accomplished it, but the summit was so enveloped in mist, that we obtained but little view from it; we walked for nearly a mile on a level upon the top, which is however, intersected by parallel ridges, so as not to be quite so flat as it appears from the sea. We then descended, and walked as quickly as possible to Symon's Town, which we did not reach till eight o'clock at night, all much fatigued, though I suffered far less than the rest. On board our ship, there had been considerable anxiety on our account, as wolves and runaway slaves are said to infest Table Mountain. The plants which I brought home, are enough to find me with work for a week to come; the commonest genera are *Erica, Protea,* and *Oxalis.* In one cottage which I entered, I was surprized to see them burning wax candles, and on enquiry, I found the people made them themselves, by boiling the berries of a plant, of which they showed me a branch."[1]

At Sea, July 14, 1813.—"We stopped one day at Johanna, an island in the Mosambique Channel. The inhabitants are mostly Arabs, who have come down from the Red Sea and settled there: the town is rather large and surrounded by a good wall, on which are placed several pieces of cannon, but they are mostly dismounted and honey-combed. The people were obliged to fortify themselves in this manner, as a protection against the Malagassymen, who used to come and carry them away for slaves; the neighbouring island being wholly deserted on this account. Since, however, Bourbon and the Mauritius have fallen into our possession, there is no market for slaves, and the people live unmolested. We paid a visit to the king, with whom we kept up a conversation by the help of an interpreter: he enquired very cordially for his friend George, and whether we had yet sent Bonaparte to hell. Some idea he certainly seemed to have of the state of affairs in Europe, as he asked about the war in Spain, and had heard that the Americans had rebelled, (as he called it) against us. He regaled us with a glass of cocoa-nut milk, which is a very pleasant beverage. The *Cocoa trees* abound all over the island, and are employed for a number of uses, besides constituting such an important article of food; the stringy parts serve for cordage, and houses are made of the platted leaves. We were abundantly supplied with fruit of every description, *Oranges, Cocoa-nuts, Pine-apples, Plantains, Guavas, &c.*

"On nearing Ceylon, its spicy gales saluted us in the most pleasing manner before we had even got sight of the land. The country all along is flat and covered with Cocoa-trees, which form a very prominent feature in tropical scenery. On going round Ceylon, the Commodore kept so near shore, that he struck on a sunken rock. He was sailing with a fine breeze, and all sails set, at the rate of seven knots an hour, when he stuck fast; the other ships following, were apprized of their danger by a signal and hove to. The Alta, however, touched three times before she could get clear, and they were all in great danger. The Dædalus floated off, but had received so much injury, that she sunk in a few hours, the crew and their baggage having been previously removed on board the Indiaman. She went to the bottom, in ninety-six fathoms water, with every sail set, and in the midst of a large fleet; such a sight was perhaps never witnessed before."

[1] Probably *Myrica Æthiopica,* or *African Candle-berried Myrtle.* ED.

Dum Dum, Dec. 1813.—"My time has been much occupied since I came here, as the whole of the medical duties of the battalions lies on me, and though not severe labour, this occupies a good deal of time. I am applying vigorously to Hindostanee, and have employed a Moonshee since I came here: my previous knowledge of Persian is very useful, many of the Hindostanee words being similar, and as I shall recommence Persian when I have mastered Hindostanee, my former acquaintance with it will render the labour much lighter. A competent knowledge of these languages is essentially necessary, and to many situations it is the only passport. Of all the Oriental languages, Hindostanee is the most generally spoken, particularly in the provinces dependant on Bengal; while in Madras and the southern provinces, it is not so much used. I am told that four different languages are spoken in the countries subject to Madras, the trouble of acquiring which is so great, that the number of natives who speak English, far exceeds that of Europeans who are acquainted with any of these tongues. My ambition, after making some farther progress, will be to gain admittance into the College, where some opportunity of distinguishing myself may arise, by which I may obtain an advantageous situation."

Camp on the Ghaut, January 9, 1815.—"On the 7th, we were in the neighbourhood of Pursah, where I viewed the field of battle, a melancholy but not uninteresting sight. The time and appearance of the spot were perfectly consonant to the feelings it was calculated to excite. The evening was gloomy, and the descending sun could scarcely pierce the thick haze that obscured the horizon. Nothing met the eye all around, but a dreary waste of jungle, bounded by the black line of forest at the foot of the hills, which were completely enveloped in mist. The chief scene of action had been a small grove of trees, whose shattered trunks bore evidence of the fire, and whose branches were now crowded with vultures. Perhaps you may think that a more sublime scene might have better suited the occasion, but the desolate uniformity that prevailed, unbroken by any trace of cultivation, had something in it far more impressive than a view whose variety might have distracted the mind from the objects before it; added to which, we were alone at a distance from camp, and in so lonely a place, that in the dim twilight, fancy could almost conjure up the ghosts of the slain.

"Although so near, we have as yet hardly seen the hills, as they have been constantly hid by fog. One day, however, at Betliah, it was tolerably clear, and we had a noble view of them, tracing distinctly the whole line of the Himalayan or Snowy Range, towering above the hills immediately in front, which, though of great elevation, dwindled into pigmies before the immense barrier which shot up behind, covered with snow to the lowest visible point. These mountains indeed presented a magnificent appearance, reflecting the first rays of the morning sun. By the most moderate calculations we have been able to make, both from our own observations and the data given by Kirkpatrick, in his *Account of Nepaul;* they are several thousand feet higher than the Andes, hitherto considered the loftiest in the world."

Camp, Bechiaco, Feb. 11, 1816.—"We are now encamped in the stony bed of a river, nearly dry at this season, with hills covered with wood rising on every side of us. I like this scenery; as it reminds me somewhat of *my own* country. Fancy to yourself an immense ravine, winding among the hills, which looking upwards, appear as they rise behind one another, in the perspective, to close it in somewhat in the form of a huge amphitheatre; the bottom about half a mile in breadth, covered with white sand and stones, with three or four little streams, scarcely ancle deep, creeping along among them—the camp, in motley variety, extending along this bed; the small village of Bechiaco, occupied by one of our battalions, perched upon the top of the bank, and seeming to

command the whole; the picquets scattered here and there along the sides of the hills, and on looking back, the level line of forest, the only part of the whole view which departs from the line of beauty. Sometimes you see vast columns of smoke arise where the grass has been set on fire, and the wind carries the conflagration along, till it involves the whole side of a hill. When the flame is thus swept among the green bamboos and reeds, the air contained in their cavities becomes so rarefied as to burst them with a report like a gun; and at some distance, these successive explosions have the effect of a running fire of musquetry. This burning of the grass is one of our expeditious modes of clearing a way for ourselves."

Dinapore, May 16, 1816.—"I have lately had occasion to change my Moonshee, and have got one who pleases me very much, as he really possesses a good deal of knowledge, and has more taste than most of them. Like all Orientals, however, he has no idea of simplicity being an excellence, and attaches great merit to excess of ornament, metaphors, conceited enigmas, &c. This taste seems to have prevailed at a certain stage of the literature of every nation with which I am acquainted, and to have gradually yielded to the influence of more correct judgment. The Asiatics, however, have never got beyond this point, and there they are likely to remain for a good while yet to come. I continue to read Persian several hours a day, and think I have made some progress: the kind assurance of my friend, Major H., however, who declares, that in three months, I shall have as good a knowledge of the language as most persons in India, must, I fear, be considered as a little exaggerated."

Dinapore, Nov. 14, 1817.—"I have lately opened a correspondence with Dr. Wallich, the Superintendent of the Calcutta Botanic Garden, from which I expect to derive both pleasure and advantage. Till now, I have always felt at a loss in my botanical researches, from not being acquainted with the progress of the science in India, and particularly with Roxburgh's extensive labours and discoveries, so that I never could be sure that my own were not anticipated. It was to remedy this, and to obtain, if possible, a copy of Roxburgh's manuscript descriptions, that I wished to commence an intercourse with the present Superintendent, who is a good Botanist, and a highly respectable man. In the first letter which I wrote to Dr. Wallich, I sent him some seeds, and a description of a *Lobelia,* which I had found in Nepaul, and which did not agree with any published species. I received in reply a most friendly letter, accompanied by some papers of his own on Indian Botany, informing me that my *Lobelia* was a *perfectly* new species, and soliciting further communications. I have since transmitted to him another despatch, with more plants which I conceive to be new; and I am convinced, that I possess a great many which are entirely so, a point which I shall now have the opportunity of ascertaining. Our old remark, that Botany formed a kind of bond of friendship among its votaries, promises to hold good in the present instance."

Calcutta, July 19, 1818.—"I have paid a visit to Dr. Wallich, at the Botanic Garden, a short distance from Calcutta; he received me with great kindness and warmth, and insists on my coming to stay with him while I remain here. He is not only a good Botanist, but an excellent physician, and much inclined to assist me in obtaining some situation, which may open a field for Botanical research, and connect me with himself in that department. He has already introduced my name with due acknowledgments, in a paper presented to the Asiatic Society, containing an account of some new plants from Nepaul, one of which was communicated by me. *Roxburgh's Flora* is now in course of publication, and receives all Dr. Wallich's additions since his time; a new species of *Veronica* is introduced on my authority and described there, and I have no doubt that others will yet be added as the printing proceeds."

Calcutta, Aug. 19, 1818.—"Dr. Wallich has kindly insisted on my staying with him to pursue my Botanical researches: he has an excellent house in a delightful situation, about six miles below Calcutta, where I hope to pass my time most agreeably, free from those temptations to fatigue and exertion which beset me at Calcutta, and where I trust to be so much benefited by ease of body and mind, that my health will improve as fast as it could do from a sea voyage, to which so many inconveniences are attached. Though my plans are hardly arranged, I expect that my Botanical knowledge will turn to some account. I am now engaged in drawing up a paper on some of my discoveries, which I have promised to furnish for a periodical work, about to be printed at the Serampore press, to which Dr. Wallich has agreed to contribute, and he wishes for my aid in the performance. We also propose, some time hence, to undertake jointly a Botanical work, for which we possess ample materials in the immense number of new plants which he has already received, and is daily receiving from that most glorious and unexplored field, Nepaul. It will be illustrated by figures, and you must know we have got natives instructed to engrave in a manner that will surprise you. I am prodigiously busy preparing my paper, and making some drawings of the new vegetable productions, which I discovered during my Nepaul campaign. Dr. Wallich is really a most noble excellent man, and has shown the warmest and strongest interest in my favour."

Botanical Gardens, Calcutta, Nov. 10, 1818.—"I hasten to inform you of the occurrences of the last few days, which have made a considerable alteration in my plans, since I wrote to you. Some days ago, Sir Stamford Raffles, the governor of Sumatra, came here to see the garden, and spent the day, during which Dr. Wallich and I had a long conversation with him, the result of which has been, my agreeing to accompany him to Sumatra, and his promising to forward my views, and in particular, to afford me every facility for exploring the Natural History of that island, where I doubt not to meet with many new and interesting things, by sending which home, I may form some useful connections. I expect to sail, shortly, with Sir Stamford Raffles, in the Company's cruizer, "*Nearchus*." The party will consist of Sir S. and Lady Raffles, two Civilians on the Bencoolen Establishment, an Artillery Officer, and two French Naturalists, who have been recommended to Sir S. Raffles, and whom he employs as such; their subject is the Animal Kingdom—one of them is nephew to the celebrated Cuvier. Sumatra being, in part, a volcanic country, I intend to study its Mineralogy as well as its Botany, and have purchased the last edition of Jameson's Mineralogy, by the aid of which, with two other works on the same subject, and all the observation I can bestow, I hope to make some progress. Sir S. Raffles possesses a large and very scientific library, which he kindly offers to place entirely at my command."

Pulo Pinang, 7th March, 1819.—"I am botanizing with great ardour; there is a great field here, and it is really astonishing how much I find that is new in a place that has been so long in British possession. The fact is, that the whole of the Eastern Islands have been scarcely the subject of scientific research, or in so superficial and imperfect a degree, as rather to excite than satisfy curiosity. Sumatra is almost a virgin country; for though we have had a settlement on it at Bencoolen, no individual there before Sir Stamford ever penetrated into the country twenty miles beyond its limits. Java, which is much better known to us, differs, though situated so near, from Sumatra, in its whole constitution, being entirely volcanic, while the latter is in a great measure, of primitive formation; the soil, productions, every thing is unlike. The vast Eastern Archipelago seems to present four great divisions, differing in their population, soil, and every respect. Sumatra, including the parallel coast of the Malay Peninsula, is the country of the Malays, and forms, as it were, the extre-

mity of that vast mountainous ridge, stretching from the North of Hindostan through the Burman and Assan empires, to the Streights of Sincapore. Java forms part of a volcanic range, which runs parallel to the Equator, from the termination of the former. Borneo is a vast continent, not volcanic, producing diamonds, &c. and essentially different from the Javanese portion. The Moluccas may be considered the fourth division, the native country of all the valuable spices, and other products of the East, which are peculiar to these favoured spots, and not found in the other grand divisions.

This island has yielded me no inconsiderable botanical harvest. During the last three months, I have described above one hundred and thirty plants, of which eighty are probably quite new, besides examining and ascertaining at least as many more. I have drawn some myself, and I have a Chinaman employed, who has finished a considerable number of drawings."

Singapore, June 7th, 1819.—"At length we are clear of that land of delays, Pinang, and have arrived at this royal city, which will, sooner or later, become, I think, the capital of the Eastern islands. We left Pinang on the 22nd ult., having concluded every thing in style. Before we started, answers were received from the Supreme Government on the subject of Singapore, highly approving of Sir Stamford's measures. We had a very pleasant voyage down the Streights, and arrived here in nine days, having commenced the study of the Malay language, called the Italian of the East, by the way, in which Sir S. Raffles, who is an excellent Malay scholar, assisted his lady and myself. Besides this, I had full employment in bringing up the arrears of my Pinang Botanical collections, and in reading a number of papers that I received from Sir S. Raffles regarding the Eastern islands, with which I am determined, now that I have the opportunity, to make myself acquainted. The Flora of Singapore is very splendid. We expect to reach Bencoolen in about a month, and as the Southerly Monsoon has set in, our course will be along the shores of Borneo and Java."

Singapore, June 20th, 1819.—"My last letter from this place was sent by way of Pinang; this goes home by Bengal. It is impossible to conceive any thing more beautiful than the approach to this place through the Archipelago of islands that lie at the eastern extremity of the Streights of Malacca. Seas of glass wind amid innumerable islands, clothed in all the luxuriance of tropical vegetation, and basking in the full brilliancy of a tropical sky. The Island of St. John's, which forms the western point of the Bay of Singapore, would, if fortified, command with its cannon, the Streights through which every vessel passes to China and all the Eastern Settlements. A more convenient and more formidable situation could not possibly be selected, and it is really astonishing that it should have remained so long unnoticed. It was the capital of the Malays in the twelfth century; but they were obliged to abandon it during their unfortunate wars with the Javan Empire of Majapuleit, and retire to Malacca; and when the latter was taken by the Portuguese, they settled at Lahore; and Singapore has, till now, been almost forgotten. I have no doubt it will soon rise to more than its ancient consequence. It is surprizing how much this place has increased since we made it a settlement—many thousands of persons have already come, and every day adds to their number; the present villages are quite insufficient to contain them, and the work of clearing and building goes on with great rapidity. Numbers of Chinese and Bugguese have come, both active and industrious people. I have just arrived in time to explore the woods before they yield to the axe, and have made many interesting discoveries, particularly two new and splendid species of Pitcher Plant (*Nepenthes,* Linn.), far surpassing any yet known in Europe. I have completed two perfect drawings of them with ample descriptions. Sir S. Raffles is anxious that we should give publicity to our researches in some way or other, and has

planned bringing out something at Bencoolen. He proposes sending home these Pitcher Plants, that such splendid things may appear under all the advantages of elegant execution, by way of attracting attention to the subject of Sumatran Botany. There is a plant which Sir S. has met with in Sumatra, which appears to be the wonder of the vegetable world,[1] for its flowers are of the colossal dimensions of a yard in diameter! I would hardly venture to mention this, did I not know that a specimen has actually gone home in spirits. We made a sailing expedition lately among the islands, and spent the day very pleasantly in exploring them; we carried our provisions with us, and spread our table in the woods, protected from the sun by the dense shade. Here I saw, for the first time, the coral banks of tropical seas in perfection, and nothing certainly can be more beautiful. The water was as clear as crystal, and through it appeared the corals in every variety of form and colour, their hues softened and heightened by the transparent medium. These banks frequently rise almost perpendicularly from unknown depths to the surface, the stupendous works of animals that almost elude observation. It is also a curious question whence is derived the enormous quantity of lime thus deposited."

Bencoolen, Sept. 28th, 1819.—" I have been employed in an important subject, which Sir S. has entrusted to me, namely, an inquiry into the state of society among the people subject to Bencoolen, particularly into their laws and customs, and the effects of the Company's monopoly on their character and situation, with a view to furnishing data whereon to found eventual measures for their improvement. This you may conceive will be a task of some difficulty, especially as I come to it unprepared by local experience, but Sir Stamford is so determined upon it, and affords me such advice and encouragement, that his kindness, together with the knowledge that he may turn the result of my inquiries to important use, has decided me to do my best, especially as I see that there is no other person who either can or will attempt it.

" To give me every possible aid, and to add importance to the undertaking, Sir S. has appointed two gentlemen to form a committee with me for this object—one of them is Captain Methwin, Malay translator, whose thorough knowledge of the language is of the greatest use to me; still the greatest share of the labour devolves upon myself. The subject is really a curious one, and exhibits a different form of society from almost every other that I know."

On board the Favourite, in the Hoogly, Bengal, Nov. 17th, 1819.—" When I left Bencoolen, the Report on the state of Society was not begun, though I had been collecting the materials for it: before sailing, our Committee met, and my two colleagues gave me *carte blanche* to draw up what report I thought proper during the voyage. I have accordingly prepared one, which I call our First Report, and as there are some points of detail, particularly on the subject of population, which would only have embarrassed the general view, and would come better into an Appendix or Supplementary Report, I have taken up the subject in its widest field, and have brought in a view of the Colonian Administration of the place. Sir Stamford is well pleased with the result of my labours, and has forwarded it to Calcutta, with a very high recommendation, and soliciting the Marquis's attention to it. He will

[1] *Rafflesia Arnoldii* of Brown, in the 13th Vol. of the Transactions of the Linnæan Society, where we scarcely know which to admire most, the admirable execution of the plates, the learning displayed by the author in his history and description, or the extraordinary plant which is the subject of the memoir. Another species, *R. Patma*, and a nearly allied Genus, *Brugmansia*, have been found in Java, by Dr. Blume, who has constituted for them a new order, *Rhizantheæ*, so called because the plant consists solely of a flower springing directly from the root of another plant, on which it is a parasite. It is remarkable, that another plant of the same Order has been discovered by Bertero, in Chili, growing upon the stems of *Adesmia microphylla*, the *Pilostyles Berteroi* of Guillemin in the Annales des Sciences Naturelles, 2nd Ser. v. 2. p. 21. t. 1.; and this is so minute as to bear the same proportion to the type of the Order (*R. Arnoldii*) that a line does to a foot.

likewise send a copy to the Court of Directors. We have also been employed in drawing up a paper for Lord Hastings, on the future government of the Eastern Islands, proposing great reforms and alterations, and have suggested the propriety of establishing a native college at Singapore. I consider it a most fortunate day which brought me acquainted with such a man as Sir S. Raffles. He possesses a singular energy of character which communicates some portion of its influence to all around him, and I hope to improve myself not a little in such society. The opportunities which I now enjoy will not, I trust, be thrown away. I told you of his promise of making me his Secretary; he has employed me as such; but difficulties have been thrown in the way of rendering it a regular appointment. If I do obtain this situation on the new footing, I shall then extend my views; and am sadly deceived if I do not bring them to some consistency and bearing, as I shall then enjoy the fullest opportunities of making myself thoroughly and deeply acquainted with every thing relating to the Eastern Islands, their policy, state, &c. It is a new field, and one on which there is a general deficiency of local information."

On board the Indiana, off Nattal, Feb. 29th, 1820.—"I sit down to fulfil my promise of sending you some account of Tappanoolly and the Battas, who inhabit the interior of that part of Sumatra. They had been stated to be cannibals, and we were curious to ascertain that fact, and learn *something* of so peculiar a state of society. We therefore assembled some of the most intelligent chiefs, whom we examined at length respecting all their usages and customs, and obtained the amplest and most indisputable information on *every* point. The history of these people is so extraordinary and peculiar, that I should not have credited it on any evidence less convincing than that which we received, and should almost fear to communicate it, were I less certain of its absolute correctness. That they are cannibals is placed beyond a doubt, but the circumstances and manner in which this revolting custom is practised stand, I believe, unparalleled in the history of the human race. The eating of men is not merely practised by them in war, as in some other savage countries, but is the punishment solemnly and deliberately decreed by their laws for certain capital crimes. Five cases are enumerated, in which eating the offenders is ordained, of which the first, and in their ideas, the greatest, is adultery. The sentence is passed in full council by the assembled chiefs, and publicly carried into effect three days after, when the whole neighbourhood is collected. The victim is tied up, with his hands extended, and the injured party is asked what part he prefers. He perhaps chooses the ears—these are instantly cut off, and he deliberately eats them, either raw with limes and pepper, or drest as he pleases. All present then help themselves to and devour what portion they like; and after all are satisfied, the chief enemy cuts off the head and carries it home, to suspend in triumph on the top of his house. Thus the culprit is literally eaten alive, and with a coolness and deliberation that I believe to be absolutely unparalleled. You will have difficulty, I know, in crediting this, but I tell it you plainly, as I received it from the people themselves, who seemed to think very little of it. Such severity of punishment must, of course, operate to render the crime of rare occurrence, and another check to its frequency is, that the injured party may, if he please, commute the sentence into a pecuniary compensation, which avarice often tempts them to do. In short, it seems to be like Shylock's pound of flesh, an atonement the aggrieved individual has a right to claim, and which he may dispense with if he pleases. The Battas are evidently of Hindoo origin, and these customs afford another example of the *mild* spirit of that religion which denounces damnation on the slayer of a cow or an ant, yet makes sport of human life, and of every affection of our nature. Formerly it was the custom of the Battas to eat their parents when they became too old to be useful, but they say that latterly it has been

abandoned. Now you will, of course, suppose that these people are sunk in the lowest state of barbarism; but, strange inconsistency! it is quite the reverse; and they possess many noble and estimable qualities. In point of veracity and sense of honour, they are as much superior to the Benghalees, as we are to both. Their deportment and behaviour are manly and independent; and in some things their notions are carried to a most extravagant length. A man must not marry a woman of his own tribe, but must seek a wife in some other tribe, that acknowledges different ancestors. The breach of this rule is punishable with eating, which is carrying the idea of consanguinity much further than we do. If two men quarrel, and their difference cannot be settled by mediation, they go to war, but must, before commencing hostilities, publicly proclaim their design in the fairs, that the other may have due warning. If one man should kill another without this public proclamation, he would be sentenced to be eaten; but after it, all is fair. Even then, however, being only a private quarrel, he is not permitted to eat his enemy, though he may kill him, as it is only on grand occasions, when the whole nation goes to war, that cannibalism is permitted. At the fairs, it is a point of honour that no violence or treachery be committed; a man who carries his musket to the fair sticks a green branch in the muzzle, as proof of his peaceable intentions. The Battas have a written character, peculiar to themselves, and books on various subjects; we have got an account of five or six.

"The country in the interior is populous and well cultivated—and further, it abounds with gold. Camphor (*Dryobalanops Camphora*) and Benjamin (*Styrax Benzoin*) are the wild products of the forests, and are procured in no other part of the world; thus few countries surpass Sumatra in natural riches. The people of the interior have an aversion to the sight of the sea, believing it to be the abode of evil spirits, and the inhabitants of the coast are consequently an inferior race. They acknowledge one Supreme God, and three inferior divinities, whose names, as well as the title of their greatest chief, Sa Singa Maha Rajah, which is pure Sanscrit, proclaim their Hindoo origin. So extraordinary a people would require to be better known, and we shall, probably, sooner or later, make an expedition into their country, which will be very practicable, as the Chief of Baroos, one of our friends, has lately married the daughter of a Batta chief. I should have mentioned that women are excluded from these human feasts. Who knows but we may yet civilize and reclaim these people? I think they have sterling qualities that would make it worth the while. At all events, I should like to get among them, and have ocular proof of their customs. Perhaps I may yet be present at one of their human feasts! We told the chiefs we were anxious to partake, and asked which were the epicurean morsels. They laughed, but said that the palms of the hands and soles of the feet were the pieces most prized.

"The harbour of Tappanooly is most noble and extensive: the hills come down to its edge, and are clothed with luxuriant forests of camphor, &c. Our settlement is on a very small island in the midst of it, most romantically situated, where there is a small Fort, two or three houses for the Resident and his assistants, and a small Bazaar of three or four hundred people. The population around is very scanty, and their villages are situated in the hollows of the hills, where they lie hid until you come close upon them. The camphor-trees are the monarchs of the forest, rising often to a height of one hundred feet perpendicular, before giving off a single branch, straight as masts, and of proportionate diameter. We had one cut down, and got a little camphor in it; this substance is found in concrete masses, lying in hollows and cracks in the heart of the tree. Very little of it finds its way to Europe—it chiefly goes to China, where it bears a price about thirty times higher than the Chinese camphor, which is the article we use. The latter is the produce of the *Laurus Camphora*, and

obtained by boiling: the former, of an imperfectly known genus, called by Gærtner, who only saw the fruit, *Dryobalanops*, and is the native produce of the tree. It is not exactly known what occasions its enormous value in China—three thousand dollars for a pekul of 133 lbs. It has been supposed that it was employed to mix with their own camphor, and sold again in that adulterated state, but the difference of price renders this improbable. I think rather that the Chinese, whose epicurism is very extraordinary, and different from ours, use it in some way for culinary purposes. Besides camphor, the tree yields an oil which is very powerful. It flowers only once in four or five years, and was not in blossom when I saw it: I got specimens, however, last year. I scrambled over several hills during the two days we remained at Tappanooly, and found some new plants. This country is, in fact, new and untrodden by the foot of science—a harvest reserved, I hope, for me to reap, and it shall not be neglected, for every advantage and opportunity are mine."

Bencoolen, March 12th, 1820.—"I have obtained a flower-bud of the gigantic plant I formerly mentioned to you. It is really one of the wonders of the vegetable kingdom—the head is of the size of a large cabbage, only more flattened. I have opened it, and ascertained its structure, which is as unique and peculiar as its dimensions, and seems to set analogy at defiance. I have not procured the fruit, or been able to learn its situation, but of the inflorescence I am making drawings, which I hope to publish in my first fasciculus. The two Frenchmen whom I mentioned as having been brought hither by Sir S. Raffles, have been very industrious, and made very large Zoological collections. Among them is a new animal, which comes next in size to the *Rhinoceros*, and resembles the *Tapiir* of America, but is a much larger creature than the latter, with a white band over the back and sides, just in the situation and to the extent of a saddle-cloth—the rest of the body is black."

Bencoolen, April 10th, 1820.—"A ship having unexpectedly arrived, bound for England, I avail myself of such a fortunate opportunity to transmit to you the first part of our account of our Zoological collections. I have been employed on it ever since I wrote last, and have just finished the first and most important portion, containing the Mammalia. This paper, which will, I trust, prove interesting, is to appear in the Transactions of the Royal Society, under Sir S. Raffles' name, and you will be able to see it there. We have taken much pains to obtain full information on the subject, and for this purpose have had assemblies of all the native chiefs, whom we have questioned much in the way that Rheede is said to have done those in India. My Botanical labours must be, in a great measure, suspended till this business is over. I am paying some attention to Malay, and find it an easy language, which I hope soon to master; but the day is always too short for my work. I have now made it a rule never to sit up at night, unless in very urgent cases, as I find it is more than the constitution can stand in this country. I paid a visit some days ago to a spice plantation, about eight miles out of town, and spent the day there—it is delightfully situated. Some people whom I sent out to get plants, brought me some very interesting ones. We plan a trip for some weeks to a country house at some distance inland, both for variety and for Botany. It will also be an escape from business and the troublesome people here. The society of this place is exceedingly indifferent—in fact, there is scarcely any energy or spirit among the inhabitants, whether natives or old-settled Europeans; an excessive indolence prevails over them all. I lately sent to England, by the Mary, a short account of some of my most interesting plants, to be noticed there in some way or other, including the Sumatran gigantic flower, my two new *Pitcher-Plants*, the *Camphor*, the *Sago*, and a new genus of mine, which Sir S. Raffles has forwarded for me, with the drawings of them, to Mr. Marsden, to make such use of them as he may think best. I have now been appointed on a Committee to inquire into the state

of the Manna districts, and report on a new Constitution and Laws for them. This will be a business of some time, however I shall throw a good deal of the detail on my colleagues. I can only add, that I am well, and as busy as a bee."

Bencoolen, May 26, 1820.—"The weather is becoming very favourable for excursions into the interior. In general, we have here a great deal of rain, every second or third day proving wet; and now, for a wonder, it has been dry for ten days. So near the Line, these rains are probably beneficial, as they cool the air; but I confess, I prefer the steady seasons of the continent of India, where you can almost calculate, with certainty, upon the state of the weather. We have, at present, no less than three Sultans here — the Sultan of Judrapore, and the new and ex Sultans of Moco-Moco. There is something farcical in these high-sounding titles, when applied to men, whose whole revenues do not amount to as much as we would pay a common writer in an office. But you will, perhaps, be still more amused by an idea which we actually put into execution this morning, of appointing a committee to investigate and report on the customs and histories of all the Birds of Sumatra; in short, to collect all the native information about them, for the purpose of completing our paper for the Royal Society. This *Special Committee on the Birds* is composed of the Sultan of Judrapore, Rajah Dyan Mabela, Raden Aria Surca (*i. e.* Child of the Sun), Dyan Indra, and another Raden. I suppose it is the first time that Sultans and Rajahs have ever been so employed; however, I have no doubt we shall receive a very amusing report.

Bencoolen, Aug. 19, 1820. — "I have now finished my first report on the Agricultural Society, which we think of printing, along with my account of the state of Society and some other Statistical papers. During our absence at Calcutta, Sir Stamford gave a few miscellaneous articles to the press, merely to keep it employed; and, as these amount to a small volume, he thinks of bringing it out under the title of *Malayan Miscellanies*, vol. i. I have added the descriptions of a few plants, and we shall probably continue the same plan, and the second volume will be much better than the first. It is now my intention to preface the descriptions and engravings of plants, which I formerly mentioned, with a general view of the Natural History of our Eastern Islands; a plan by which I think the subject may be made generally interesting, and attract public attention to this quarter. Much time and labour will be required to collect and arrange the materials, but the means and advantages, which I at present possess, are such as ought not to be lost."

Tello Delam, Pulo Nias, Dec. 12, 1820. —"Pulo Nias is now a British Possession, in full sovereignty, and our principal station is established at Tello Delam, the finest harbour on the island. It is really a beautiful spot: the shores are skirted by hills of no great elevation, covered with Cocoa-nut trees, except where their sides and bottoms are cleared for Rice fields and plantations of sweet Potatoes and other vegetables. The villages are placed on the tops of the hills, in very picturesque but inaccessible situations, having been built with a view to defence, so that it would try the wind of any but a Nias-man to reach them. With the people I am, on the whole, highly delighted; they exhibit a mixture of barbarism and civilization, that makes them very interesting. In agricultural industry, in the building and internal comfort of their houses, they show a great advance in the arts of life; while, in their war-dresses and many of their customs, they bring to mind the accounts of early voyagers in the Pacific Ocean. On our visit to the Rajah of Ilitubara, we were received, at the bottom of the hill, by a party of twenty warriors, armed with spears, shields, and sharp swords, defended by leathern coats of mail, and their physiognomies rendered terrible by a helmet of Ijan, the long black hairs of which formed huge artificial mustachios and beards. On our approach, they com-

menced a war-dance, with the most violent gesticulations, sounding their shields to a kind of measured time. We then ascended: on entering the Rajah's house, we were welcomed by a universal groan from the company, and invited to take the seat of honour, at the head of the spacious apartment. After a little while, the ladies came to pay their respects; and the first time we saw them, we certainly opened our eyes, for their entire dress consisted of a cloth from their loins to their knees, leaving the whole upper part of the body quite naked; yet, such is the force of habit, they were unconscious of the least indelicacy; in recompence, their head and neck ornaments were elegant, and all of pure gold. We made them very happy by some little presents of coloured handkerchiefs. There is a native politeness about many of the people, that is highly pleasing: the Rajah of Ilitubara is one of these. He is a young man, and attached himself, from some cause or other, particularly to me, always constituting himself my especial attendant, and by a number of little attentions, endeavouring to render himself agreeable. They are a handsome and warlike race, uncommonly active and athletic. Among the barbarous customs that we are surprized to find among such a people, is that of suspending human heads to their houses, on great occasions; this is considered a privilege of royalty.

The Slave Trade has been the cause of great evil to this country, and there will be some satisfaction in rescuing so fine a people from its horrors, which I hope we are in a fair way of effecting. We arrived on this coast on the 14th of last month, and have been employed, ever since, in negotiations with the different chiefs. The island is divided into an infinite number of districts, all independent of each other, and with the chiefs of which it was necessary to treat separately. The maps give no idea of this island, so I need not mention much of places;—it is actually far less known than Otaheite. You may suppose that our objects were not always easily attained, especially as the restriction on the Slave Trade struck at one great source of their profits; and there were other troublesome questions sometimes involved, particularly when we came in contact with the Chinese, settled at some of the northern ports. I think that Sir Stamford will be satisfied, when he finds that all essential points are carried, though some lesser details are not exactly as I would have them. I doubt whether we shall reach Bencoolen this month; but I am in the best of health and spirits, busy in framing a report on Pulo Nias, and well satisfied with the successful result of our labours."

I extract the following interesting account of the island of Pulo Nias, from a notice given by Mr. Jack himself, in the Malayan Miscellanies, Vol. 2, No. viii.

"The island of Pulo Nias has hitherto been very imperfectly known to Europeans: it is the largest of that chain of islands which skirts the western coast of Sumatra, and is at the same time the most populous and best cultivated. It is about seventy miles in length, stretching from S.E. to N.W. Its surface is, for the most part, hilly, but not mountainous; it possesses several rivers of considerable size, whose mouths or qualloes afford entrance to native vessels and boats. There are several good harbours, both at the northern and southern end of the island, and there is anchorage for ships almost all along the eastern coast. The general aspect of the country is highly pleasing towards the sea, the slopes of the hills are either covered with cocoa-nut trees, or with long grass; but, it is not till looking down, from their summits, upon the country beyond, that its full richness bursts upon the view. From thence, the valleys and sides of the hills appear a sheet of cultivation; their summits are crowned with clumps of trees, which mark the sites of the different villages, and the dark sombre hue of undisturbed forest is no where to be discovered. The soil is one of peculiar fertility, of great depth in the lowest grounds and valleys, and even on the steep declivities of the hills, supporting

luxuriant crops of rice and sweet potatoes.

"The population is very considerable, with reference to the extent of the island, being estimated considerably to exceed two hundred thousand souls. They are an active, athletic race, about the middle stature, fair as Asiatics, and with much finer features than the Malays. The nose is more prominent, and has somewhat of the Grecian straightness; the expression of the countenance is generally pleasing, and the eye is particularly fine and full. The women are considered the beauties of the Eastern Archipelago, ranking, in this respect, with the women of Sulo. The observation which has been made, that the people of Nias are particularly subject to a leprous scurf, can only be true with reference to Nias slaves abroad; for it is in no degree the case with them in their own island, where no instance of such an affection of the skin was observed; and where, on the contrary, they appeared to be remarkably clean and neat in regard to their persons. That they practice habits of personal cleanliness is evident from the pains they take to have large and convenient baths, in or near their villages. There are always two—one appropriated to the men, the other to the women, enclosed with high stone walls, and having a stream of water conducted into them, so as to fall over a trough from a considerable height, making an excellent shower-bath.

"The villages are, for the most part, situated on the pinnacles of their hills, and always in defensible situations. This practice has, no doubt, originated in the state of warfare, in which they are almost constantly involved. They are divided into numerous independent tribes or clans, between many of which perpetual feuds exist, which have been handed down from generation to generation, for an unknown period. These feuds occasion frequent disputes between neighbouring tribes, and the taking of slaves obliges them to be constantly on their guard; and they never go any where beyond their own houses unarmed. Their arms consist of a spear, a short sword, and an oblong wooden shield; besides which they generally wear a stiff leathern jacket, which serves as armour; and, on particular occasions, a helmet of thick leather, ornamented with a crest of Ijan hair over the top, and a huge artificial beard and mustachios, made of the same material. In this dress, they have a strange and formidable appearance; they seem to be expert at the use of their weapons, and display great agility in their warlike evolutions. The ordinary dress of the common people consists merely of a baju or jacket, and a cloth rolled round the waist, and carried between the thighs. That of the chiefs, and men of rank, is more costly, and often elegant; red is their favourite colour, and they display a profusion of gold ornaments. Thick necklaces or rather collars, of a peculiar pattern, and large ear-rings, are worn; but, the most striking and peculiar of their ornaments is a crown of pure gold, of a very original and, at the same time, elegant construction, somewhat resembling a high Persian cap, with a long peak in front. The women also wear a great number of these ornaments, viz.—the same heavy collars; very large ear-rings, by which the lobe of the ear is much distended and pulled down; fillets of various patterns, generally of embossed gold plate, round the head; while the hair is gathered into a knot on the top, which is also fastened by a gold plate. A few flowers of the red Syrian rose, tastefully stuck into the hair, set these off to still greater advantage. Their dress, however, is very extraordinary, amid such display of barbaric wealth, consisting solely of a piece of cloth, rolled tightly round the loins, secured by a broad belt of gold or brass chain-work, and extending downwards to the knees. The whole body, above this, is left completely naked, displaying their form in all its reality of perfection or imperfection. There is no seclusion of females from the vulgar eye, and, on all occasions, they come forth to pay their respects to strangers, with perfect ease and confidence. The display did not, however, tend to confirm the observ-

ation, that "when unadorned, adorned the most," and it is, perhaps, better policy to leave a good deal to the imagination.

"The houses are built of wood, in a very substantial and commodious manner, and are in general of large size. They are raised upon large mirban or iron-wood timbers, and the walls are made to lean outwards at the upper part. In the northern part of the island, they are generally built detached from each other, the whole wall leans outwards, and the ends are rounded; in the southern districts, the houses are built close together, in regular streets, narrow in the front, but of great depth, and having only the two end walls leaning outwards. The entrance is by a trap-door, and a ladder in the centre. The hall, or public apartment, is spacious, and looks out upon the street. The walls are frequently pannelled, and the floor is often constructed of broad planks of Bakou (a species of *Rhizophora*), which are dark-coloured in the centre, and white at the sides, the line of separation between the two colours being abrupt. They are nicely fitted to each other, so as to have somewhat the appearance of alternate slabs of different coloured marbles. On the rafters above, are suspended, in one line, all the porcelain of the family, each plate in its own wicker case, and sometimes amounting to a few hundreds; on another, the jaw-bones of the hogs that have been killed on great festivals; the numbers of both these are indicative of the wealth of the owners. Hogs are an important part of the domestic establishment, and are the most general food of the inhabitants. They are not suffered to be in their houses or villages, but large substantial buildings are constructed for them at a little distance, and certain of the slaves are specially appointed to the care of them. They are fed on cocoa-nuts, boiled rice, and sweet potatoe tops. Rice is the staple export of the country, to the extent of about twelve thousand bags a year; it is grown both in ladangs and in sawahs, but it is remarkable, that it is very little used by the people themselves, who chiefly subsist on sweet potatoes, and other farinaceous roots, along with pork and poultry. Neither buffaloes, cattle, nor horses, are indigenous to the island, though a very few have, here and there, been imported by Malays, who have settled at some of the northern qualloes. There is a good deal of difference between the people of the northern half of the island and those of the southern. The former have intermixed more with the Malays and Achinese, while the latter jealously exclude all such strangers from settling among them, and are therefore, perhaps, the more genuine and original of the two.

"Marriage by jujur is universal, and the amount is very high, varying according to the rank of the parties, from sixty or seventy to five hundred dollars, and is, for the most part, paid in gold. It is remarkable, that, in all countries where the custom of jujur strictly prevails, that female honour is carefully guarded, and that great purity of morals is observed. It is easily accounted for, from its being so much the interest of parents to preserve the virtue of their children; and, however contrary to our notions this purchase of wives may be, and, whatever other inconveniences may attend the custom, it cannot be greatly condemned where it has been productive of the effect of raising the female character. These people have never adopted the Mussulman idea of preserving the chastity of their women by immuring them in harems, and degrading them to the condition of slaves; they have trusted to the strictness of education, and to moral restraints early inculcated, and in the effect of these, they have not been deceived. The laws of Nias, in regard to adultery, are very severe, the punishment being capital. Adultery, murder, and robbery, entail sentence of death upon the offender, and, in certain cases, slavery upon his family. Sometimes, remission of the sentence can be obtained by the payment of a bangun of twenty-four pahas of gold, or one hundred and twenty dollars. The number of wives, which a man may have, is only limited by his means; but few,

except the chiefs, have more than one. When a rajah has several wives, the succession to his rank and property is not by order of priority, but descends to the children of that wife for whom the highest jujur was paid. This, no doubt, proceeds upon the presumption, that the amount of the jujur is proportioned to the rank of the lady, and that thus the succession is secured to the highest family in point of birth and rank. The mode of burial in the southern division of the island, is peculiar; the body is not committed to the earth, but is enclosed in a wooden shell or coffin, which is elevated on four posts, and then given to enjoy the four winds of heaven. Flowering shrubs and creepers are generally planted beneath, which soon climb up and cover the coffin with foliage. These cemeteries are at some little distance from the villages, and, when not quite recent, have nothing unpleasant or disgusting in their appearance; on the contrary, there is something almost poetic in the idea of placing the remains of their friends, as it were, beyond the reach of the worm, suspended in air amidst verdure and flowers; and, if they might be supposed to have had, further, a moral object in view, what could be more forcible than to see the very sepulchres hastening to decay, amid the wild luxuriance and unfading freshness of the shrubs they had supported?"

Bencoolen, April 8, 1821.—"I have never yet seen this place so completely without communication with the rest of the world, as it has been lately: we have not had a single arrival that could bring any intelligence of home, since I wrote last, nor an opportunity even of sending a letter. Yesterday a vessel came in, which I confidently hoped was from Bengal or England, and lo! it was from Ceylon, and I could, of course, expect nothing. I send this letter, by way of Batavia, by a vessel which is to touch there, on her way to Singapore. I have lately had a return of the old complaint in my lungs, which laid me up for some time; but, by dint of bleeding, blistering, and starving, I got over it pretty well, and have now only to recover strength, which I shall do very fast, I feel no doubt. I cannot assign any cause for the recurrence of my illness, for I had not been at all exposed, and it commenced and proceeded very imperceptibly, until it became so severe on the very day when I was to have accompanied Sir S. and Lady Raffles on a trip to the country, that I was obliged to stay behind and take advice. Under the idea that the writing posture does not agree with me, I have had a very high desk made, and mean never to write except standing, which is easier for my chest, and will, perhaps, compel me to use the pen rather less than I have lately been doing, since no one can stand as long a time as he can sit. This illness occurred rather inopportunely, as I was just beginning a View of the Natural History of the Eastern Islands, and it has, of course, suspended it for a while. Under the idea of bringing out this work under all possible advantages, I have almost determined, so far as one can determine on what is so distant, to accompany Sir Stamford Raffles when he returns to England. In that event, I should have leisure on the voyage to arrange my materials; and, with a little brushing up at home, might make my Sketch a thing of some character, much better than I could hope to do here, amid the constant pressure of new matter, and the daily interruptions of duty and business."

Bencoolen, May 27, 1821.—"I have lately written to Mr. Brown, at Sir Joseph Banks', upon botanical subjects, and sent him a paper on the Malayan *Melastomaceæ*, which may, perhaps, appear in the *Linnæan Transactions.*[1] I possess abundant materials for many more essays of the the same nature; but it is difficult to find good opportunities of bringing them out. They will accumulate till I can return myself, when I shall crown the whole with a broad general view."

It was during the month following the date of the letter, from which the previous

[1] It is there published, vol. 1.

extract is made, that Mr. Jack appears to have accomplished the task of reaching to the summit of *Gunong Benko,* or the *Sugar-loaf Mountain,* in the interior of Bencoolen, where it rises to a height of seven thousand seven hundred and ninety seven feet above the level of the sea, and of which he has given the following interesting account, in the second volume of the *Malayan Miscellanies.*

"This mountain, which stands detached from the regular range of hills, forms, by its peculiar and remarkable shape, an excellent landmark on this part of the coast. It lies about eighteen miles N. E. of Bencoolen, but its exact position and distance have never been correctly ascertained. Two attempts had been made by Europeans, to ascend the mountain, but without success; and, a general impression prevailed, that it was utterly impracticable to gain the summit. Remarkable mountains, of this description, are generally believed, by the natives, to be the residence of spirits, and their summits are considered as Kramats, or places of peculiar sanctity A Kramat of this nature was said to exist on the top of the Sugar-loaf, and it was reported that the natives sometimes adventured to visit it, from motives of superstition. It was therefore resolved to make another trial, in the expectation that it might afford the means of correcting and extending the observations already commenced on the coast, with a view to a more accurate survey of this part of the country.

"A party of gentlemen accordingly proceeded from Bencoolen, on the 10th of June, 1821, for the purpose of effecting this object. They crossed the Bencoolen river a little above Tanjung Agung, and proceeding through the Lumba Selapan district, halted the first night at Lubu Pooar, a small Rejang village on the banks of a stream which falls into the Sungey Lamow. Thus far the journey was accomplished on horse-back, but it was found impracticable to carry the horses any farther, and the party proceeded on foot to Punjong, a respectable village situated on the banks of the Simpang-ayer, and the residence of the Pasirah of the tribe of Marigi, the chief of the four, into which the Rejangs are divided; the others are called Bermani, Saloopu, and Joru Kallang. On the third day, they reached Rejak Bessi, the last village in the direction of the mountain, where they rested for the night. It is situated on the Ayer Kiti, a stream which falls into the Simpang-ayer below Punjong. The journey from Lubu Pooar to this, might with ease, have been accomplished in one day instead of two, had the weather permitted.

"The mountain was now to be attempted, and, in order to ensure success, it was arranged to pitch a small tent in the forest, in case the ascent could not be accomplished in one day. From Rejak Bessi, they proceeded over hilly ground gradually rising for about five miles, when they found their progress impeded by the increasing steepness of the ascent, and then halted under an over-hanging rock, where the tent was pitched, as it was impossible to carry it any further, even if space could have been found to erect it on. The course from Rejak Bessi was through deep forests, which precluded them from seeing the mountain. The last view they had of it was at Rejak Bessi, which it appeared to over-hang, and whence they were able to form some idea of the difficulties they were likely to encounter from the steepness of the ascent, and the precipitousness of the declivities. Soon after quitting Rejak Bessi, they crossed a small river on a temporary bamboo bridge, thrown across a deep chasm between two rocks, which confined the stream within a narrow channel, after being precipitated over a fall of considerable height. A fine view of this fall was commanded from the bridge, which was itself suspended about one hundred feet above the stream, and the whole formed, with the surrounding forests, a beautiful and romantic scene. About ten o'clock, they commenced the ascent of the cone, along the rocky bed of a mountain-torrent, until they arrived in front of a perpendicular face of bare rock,

stretching completely across the ravine, which had hitherto afforded a passage, and seeming to bar all further progress. This difficulty was surmounted by placing two of the longest bamboos against the rock underneath, where the bare root of a tree projected from above; by the aid of these, held fast at the bottom, and afterwards secured by a rattan at the top, they succeeded in clambering up to the tree which over-hung the precipice. The next acclivity terminated at the head of another ravine, where their progress was again checked by a jutting rock, rendered moist by the trickling of a small spring of water from among its crevices. Here the guides declared that further ascent was impracticable, and that from thence the party might return as soon as they pleased. (The fact is, they were extremely averse to their proceeding, fearing the vengeance of the evil spirits if they conducted strangers to the summit; they were, therefore, advising to return at every difficulty, and the ascent was ultimately accomplished without their aid, or rather in spite of them.) The appearances around were calculated to confirm this assertion, but before determining to retreat, they examined the extent of the precipice; and, crossing the ravine, perceived that the opposite side, though almost perpendicular, had a thin coating of soil and moss, with numerous roots of trees half laid bare, by laying hold of which with the hands and placing the toes in the niches, they at length reached the ridge which formed the right-hand shoulder of the hill. Along this, a path was found sometimes along the base, sometimes over the face of a succession of bare masses of rock, which it was necessary to clamber over by the aid of such twigs and roots as occasionally fastened themselves in their fissures. The last of these precipices was, perhaps, the most dizzy and dangerous, as it was necessary to make a step or two on a narrow ledge, on the face of a cliff of such height that the eye could not discern the bottom; and thence catch at a dry stump barely within reach, by swinging from which it was possible, with a considerable effort, to clear the rock. The denseness of the moss and the stunted appearance of the trees, now indicated their approach towards the top; and, at length, about two o'clock, they found themselves on the summit. This was a bare spot, of not more than four or five yards in breadth, with a precipice on each side, partly concealed by brushwood. Of those who set out together from the foot of the hill, a few only reached this point, by far the majority giving up, in despair, at different parts of the ascent; but the labour of those who persevered, was amply recompensed by the view which opened from the summit. The line of the coast, from Laye on the North, to a considerable distance beyond Buffaloe-point on the South, was distinctly marked. The vessels in the bason of Rat Island, were distinguishable with the aid of a glass; and the white ramparts of Fort Marlborough were easily discerned. To the South, they looked down on the hills of Bukit Kandees or the Lion's Rump, and Bukit Kabut, (the hill of mist), which formed a straight line with the Sugar-loaf. Inland, the view was obscured by a cloud which was evidently directing its course towards the hill, and it was necessary, therefore, to take the desired observations and bearings, with all possible dispatch. This was done with a small compass, none of the larger instruments having got up. The character of the vegetation was decidedly Alpine; the rocks and the trunks of the trees being covered with dense moss, and many of the shrubs belonging to genera of higher latitudes, such as *Vaccinium*, *Rhododendron*, &c. There is also found here a shrub which the natives consider a substitute for Tea, remarkable by its thick glossy leaves; it will form a new genus in the family of *Myrtaceæ*. Having finished their observations, they made haste to descend, as the cloud was now rapidly approaching the hill, and threatened a deluge of rain. They found the descent full as difficult as the ascent had been, but it was occasionally facilitated by fastening a long rattan to a tree above, and then sliding along it, down the steepest places. It

was necessary, however, to be cautious not to slide with too much velocity, in order to be able to keep a footing, when the rattan slipped from the hand. When they had got about half way down, the clouds, which had now enveloped the hill, burst in a flood of rain, and rendered the footing still more insecure. The steepest parts, however, were then passed, and the trees, for a short while, afforded some protection. But, by the time they reached the lower ravines, the waters began to swell, and the latter part of the descent was in the very bed of the torrent. They arrived at the tent about an hour before sun-set, and found the spot completely flooded; the rain had, in no degree, abated, and it was impossible to find shelter for the whole party of natives, &c., which was very numerous; it was, therefore, determined to make a push forward to Rejak Bessi, rather than pass the night in so uncomfortable a situation. A sharp walk brought them to the village soon after dark, and a good night's rest repaired the fatigues of the day. The next day was spent at the same place, both for the purpose of resting the people, and of bringing up the tent which had been left in the forest. On the 16th, they travelled to Punjong, and the following day, they commenced their return by another route, striking across the country in the direction of Bukit Kandees to the Bencoolen river. Sampans had been previously ordered to be in readiness at Tanjong Sanei, and they arrived there about eleven o'clock, having, in the latter part of the journey, forded the main stream of the Bencoolen river no less than eleven times. About twelve, they embarked on the Sampans, and placed the baggage, and some of the followers, on Bamboo rafts; the first part of the course was a constant succession of rapids, in shooting down which, some management was necessary to avoid being upset upon the trunks of trees and other obstacles that lay in the way. Twice, by being driven against these, the boat was filled with water, and with difficulty saved from being swamped. Below the junction of the Rindowati, the depth of the river increased, and the current became more regular; and, at length, they landed near Bencoolen, about nine at night, having thus accomplished, aided by the rapidity of the stream, in one day, what would have occupied several in ascending.

Gunong Benko is not estimated to exceed three thousand feet in height; but its shape, and its standing boldly out from the general range of hills, render it the most remarkable of those visible from Bencoolen. It is almost entirely composed of masses of basalt or trap, which is the most prevalent rock along this part of Sumatra. The whole of the country traversed on this occasion, is exceedingly broken and irregular, and but thinly inhabited. In the neighbourhood of the hill, it is a complete forest and very wild, presenting an infinite number of romantic and beautiful views. The soil, near the rivers, is remarkably rich, and that of the forest tracts, little inferior, particularly in the bamboo groves, which, indeed, are generally found to prevail on the finest lands. The greater part of the rice is cultivated in ladangs, but there are a few sawahs. At Tello Anou, is a small Nutmeg plantation, where the trees have never been manured, yet seem as thriving as any about town. The forests abound with noble timber-trees; few animals were seen; of monkeys, the Kra (*Simia fascicularis*), and Chingkau (*S. cristata*), were the most common; and the loud cry of the Siamang (*S. syndactyla*) was frequently heard, though they did not come in sight. It is very singular to observe the young of the Chingkau and Simpai (*S. melalophos*) embracing their mothers, that of the former being fawn-coloured, while the adult is nearly black, and the latter having the young black, while the mother is fawn-coloured, appearing exactly as if they had exchanged young ones.

"At about half the height of the mountain, the temperature of a small shallow spring was tried, where it oozed from a cleft in a rock, and found to be 68° Fah.—The temperature might, however, have

been lowered by evaporation, therefore it can scarcely be assumed as a true mean temperature, or employed in calculating the height. It may, however, be remarked that the mean temperature given by Mr. Leslie, for the level of the sea, in the different latitudes, will certainly not apply to the low latitudes in the eastern lands. 83°, which is given as the mean temperature in latitude 3°, is far too high for Bencoolen, where the range of the thermometer, throughout the year, is usually from 74° to 85°, rarely falling below 70°, or rising above 87° or 88°."

Oct. 24, 1821.—"I have just received a letter from the Secretary of the Geological Society, announcing my election, and forwarded by Mr. Colebrooke, who hopes I will not disavow what he has done in my name. My paper on the Geology of Sumatra is complete, and will probably be given in the Society's Transactions: it is sufficiently general, but its geological deficiencies are compensated by geographical information, much of which is new and interesting."

March, 1822. — "I am now going to Moco-Moco, to superintend the elevation and coronation of a new Sultan, besides which Sir Stamford has given me a commission to report on the state of the district; and, if I complete it, as I intend, by a similar visit to the Southern districts, it will, with my former reports, contain pretty nearly all that is important respecting this coast. My Botanical essay is finished; it contains seventy-five new plants, fifteen of which are new genera."

Katuun, April 21*st*, 1822.—"My last letter, which I left at Bencoolen to be forwarded to you, will have informed you of my intended trip to Moco-Moco. I started by sea, on the 1st of April, and the time was so nicely chosen, that I arrived off Moco-Moco the next evening. On the 3rd I landed, and the very next day the wind shifted to the North, so that the vessel returned to Bencoolen in nearly the same space of time, being, perhaps, one of the quickest passages ever made. We remained at Moco-Moco till the 15th, when we commenced our return by land. There I had a double commission, one to superintend the election and installation of a new Sultan, and the other to inquire into and report on the state of the district. The Sultan is elected by the chiefs, from among the royal family, and must be confirmed by the Company. The election of a successor had already been made by Sir Stamford, and my business was to make this choice good, if possible; this was fully accomplished, though some opposition was at first expected, and the election was carried unanimously. This being the case, I was authorized to cause the installation to take place immediately, without further interference. The ceremony was performed under a large temporary shed, erected for the purpose on the plain; the proclamation of the new Sultan, who assumed the pompous title of *Sultan Khalifat Allah Ilidayat Shah* (God's Vicegerent upon Earth) was first read, presents were then made to the Sultan and all the chiefs on the part of the Company, a salute was fired from the fort, and the parties all took the usual oaths of allegiance, &c. This done, we all sat down to a dinner, given to nearly two hundred people, the lesser folk seated on mats on the ground, and served with native messes, and with rum-punch, of which a hogshead was prepared; and the royal part of the company at our table. After dinner, a succession of toasts followed, which quickly confused the heads of the greater portion of the guests, and we were not long of sending home the Sultan royally drunk, and most of the grandees little better. A few days after, a second part of the ceremony took place, which consisted in the Sultan's receiving the obeisance of his new subjects in state at his own house. A kind of throne was constructed at one of the windows, whereon the Sultan placed himself; the ground beneath was spread with mats, and a drapery hung from the window down to these, and a line of guards was drawn up on one side. The whole of the chiefs, headed by the chief Mantvi, then approached and bowed themselves before the face of majesty, a crowd of common

people bringing up the rear and doing the same. A long enumeration of the honours of the Sultan, of the various countries and tribes subject to his authority, with other oriental rigmarole, was read with a loud voice; after which the nobat, or royal band, struck up, and at certain changes of the tune, the prostrations were renewed; while a parcel of fellows with drawn swords ran about, as if to cut off every presumptuous head that bowed not sufficiently low. This over, the Sultan descended from his throne, and seated himself on a humbler cushion in the hall, where the chiefs came up to make their separate prostrations to the idol, who was all the while preparing and eating Siri, or Betel, out of a gold and silver box. There was something of barbaric pomp and magnificence in all this not unamusing, and I could not help wishing there was a little more real authority behind this outward demonstration of it, for verily this people are a stiff-necked generation. The day after this, the Sultan gave us a dinner in return. On almost all other days he dined with us; our regular party at meals consisting of Radin Karim and Radin Aria Surga, two chiefs sent with us from Bencoolen, the Sultan, and one or other of the juniors of the royal family. The two former are very superior men, quite European in their notions, and whose manners would fit them for any society. There was therefore no dearth of conversation, and though carried on in Malay, you might be in many an English company where there was less of ease, of sense, and even of wit and playfulness than prevailed among us. In short, a more agreeable party could hardly be desired, and our time passed remarkably pleasantly. On the 16th, having sent off our baggage the day before, we commenced our return; the stages are long, and some of them very fatiguing. We rested one day at Ipu, which is rather a pretty place. The next day's journey was very tiresome, being along a beach of fine sand and loose stones the whole way, with several little rivers to ford, and two to ferry, swimming our horses. Yesterday was, however, the worst, being wholly in the forest, over a succession of small hills, with steep declivities, where it was generally impossible to ride; in those cases we commonly threw the bridle on the ponies' necks, and let them roam up and down as they please, following them as we best could, and it was really astonishing to see what places these active little creatures made their way over. We intended to have divided the stage into two, but, by some mistake, provisions had not been sent on as ordered, to the place where we meant to have staid for the night, so we determined to push on: we were from six o'clock in the morning to six in the evening on the way, so you may suppose we were not a little tired, considering, too, the nature of the road. Fortunately we had carried something to eat with us, which we always do on the long stages; we sat down by the bank of a mountain-stream, and made our breakfast on boiled rice, put up in plantain-leaves, with cold grilled fowl, in the true native method, with no instrument but our fingers. I wish that the party could have been sketched, it would have altogether been an excellent scene. We stay here a day or two, and may perhaps make a trip up the river to look at the interior, as we are in no hurry, and can amuse ourselves as we like in seeing the country. I am as well as can be; indeed I think my journeys are always beneficial to me, and a little extra fatigue does me good, and puts me in spirits. I am continually making discoveries of new plants, and in fact have hardly time in the day for putting together all the materials and information that I collect."

This appears to be the last letter which his family had the happiness to receive from him, notwithstanding the excellent state of health and spirits in which he describes himself to be. His happy temperament and constant occupation did not probably allow of his being conscious of the inroads of disease, for it was a remark in one of his letters to his still surviving parents, "I really think if I could always have plenty to do I should never feel illness: it is only when I have leisure that I have time to be sick." The first account

we have of his illness and death is from the pen of Sir Stamford Raffles, as communicated in a letter to Peter Auber, Esq. of the East India House, dated

Bencoolen, Sept. 15*th*, 1822.—" We were to have embarked this morning for Singapore, but the wind has proved foul, and it was ordained that we should remain another day, to bury our dear and invaluable friend, William Jack. Poor fellow! a finer head or heart there never was, and whether as a bosom-friend or a scientific assistant, he was invaluable to me. He had been long ill, and returned from Java about a fortnight ago, after an unsuccessful visit for change of air. We embarked him yesterday morning in the Layton for the Cape, and he died this morning before the ship weighed her anchor. I am so depressed in spirits, and altogether so incompetent to the task of writing to his father, at this hurried moment, when all is confusion for my embarkation, that I must postpone doing it, till I arrive at Singapore, where I hope to meet Robert Jack, his brother, but as bad news flies apace, I beg you will satisfy him of the fact, should a reference be made to you, and at the same time assure him that the loss is as deeply deplored by his friends here, as it is possible it can be by his family at home; and that for myself, I am so overwhelmed by the misfortune, that I cannot command myself to enter into particulars. His character and talents stood deservedly high with all who knew him, and if any thing can afford relief to a parent's distress, on the loss of such a son, it ought to be the reflection, that he has performed the course he was destined to run with honour and integrity, and that his sphere of usefulness was as extended as his talents and ability, themselves of no common order, would command."

Dr. Wallich thus addresses Principal Jack, in a letter, dated

Singapore, Oct. 10*th*, 1822.—" When I wrote to you last, I had hopes of being shortly able to convey to you more welcome intelligence. Alas! it was otherwise ordained, and it has become my lot to condole with you on the untimely departure of your most excellent son, my dear and beloved friend, William! This sudden and most melancholy intelligence was communicated to me by Sir S. Raffles, who landed here this morning, and who deeply participates in our deplorable loss. Your son's spotless integrity, his excellence of character and of heart, and the universal esteem which he enjoyed here, have now their reward. It is therefore only my own bitter loss, and that of his revered and afflicted parents that distresses me, and which, recent as the shock is, almost overcomes me while I pen these words. Forgive me, therefore, for dwelling in this manner on this sad event: I should endeavour to console you—and I cannot console myself!"—And again, Sir S. Raffles bears the following high testimony to his character and abilities, in a letter addressed to Principal Jack, dated

Singapore, Jan. 1*st*, 1823.—" I cannot, without much pain, bring myself to the performance of the duty I am now about to undertake; but under the expectation that you will, by this time, have overcome the first effects, and in some degree become reconciled to the dispensation of Providence, which has, in this instance, fallen so severely upon you, I must no longer delay the communication of such particulars regarding your late son, as you have a right to expect from me. Before, however, I enter upon these, you must allow me, as the sincere and devoted friend of your son, to bear testimony to the spotless purity of his character, and to the high value and importance of his intellectual exertions, while he was permitted to remain among us. The warmth of his heart and enthusiasm in whatever his head and heart approved, united us in the bonds of the closest friendship, and his loss has been to me as severe as that of a brother. In the society in which he moved, there was but one feeling of admiration for his character and talents, and but one of deep regret and sorrow at the melancholy event which has so prematurely put a stop to his useful and valuable career. His health was delicate when

he first joined me, owing to an affection of the lungs contracted during the campaign in India; but it was a fever which carried him off. Poor fellow! he battled with it for months, and we had hopes to the last. The object nearest to his heart as he lay on his death-bed, and which indeed had filled his thoughts for months before, was the settlement of his brother Robert. His trip to Moco-Moco, where he caught the fever, was in a great measure undertaken with this view, and before we parted, he had my solemn pledge that I would serve his brother to the utmost of my power; and this pledge I shall always be ready to redeem. Dr. Wallich has had the pleasure of giving your son's name to a noble tree, with pendent flowers and drooping fruit, alas! too emblematical of his early fate, which he has called *Jackia ornata;* and we are desirous of placing an inscription over your son's grave, and have written to Calcutta for a suitable stone."

At Calcutta his zealous friend, Dr. Wallich, addressed the following letter to C. Lushington, Esq. Secretary to Government in the General Department:—

"Sir,—The friends of the late Mr. Assistant-Surgeon, William Jack, being solicitous to erect a monument to his memory in this (the Botanic) Garden, for which the Lord Bishop of Calcutta (Dr. Heber) has kindly offered to supply an inscription, I beg leave to request that the Right Honourable the Governor-General in Council will be pleased to grant the sanction of Government for that undertaking.

"It is now three years since a similar indulgence was conceded to the friends of the late Dr. Roxburgh, whose cenotaph is at once an ornament to the garden and a lasting proof of the remembrance in which its departed benefactors are held.

"It is needless to dwell long on the merits of the late Mr. Jack as an eminent Botanist and a most zealous contributor to science in general, they have been equaled by few, exceeded by none: they have repeatedly been brought to the notice of the Supreme Government by the late Lieutenant-Governor of Sumatra; they are gratefully inscribed on the records of this Institution, which has derived so much benefit from them; they are conspicuous on the pages of his numerous publications, and have been acknowledged by all; and I humbly submit that they are in every respect worthy of that high approbation which the concurrence of his Lordship in Council in the contemplated measure will imply. Signed, &c.

N. Wallich."

To this it is almost needless to say a favourable answer was given, and permission granted for erecting a monument to Mr. Jack within the precincts of the noblest Botanic Garden in the world.

The published writings of Mr. Jack, as far as have come to my knowledge, are, "*Descriptions of Malayan Plants,*" given in the first and succeeding volumes of the *Malayan Miscellanies,* and here re-published. Also in the same work, "*Memorandum of a Journey to the summit of Gunong Benko, or the Sugar-loaf Mountain, in the interior of Bencoolen*"—"*Short Notice concerning the Island of Pulo Nias, with comparative Vocabularies in the Languages of Nias, Batta, Bima, and Lampung, and in three dialects of the Dayaks in Borneo;*" and "*Translation of the Undang-Undang of Moco-Moco.*" In the fourteenth volume of the Transactions of the Linnæan Society, are a Paper "on the Malayan Species of *Melastoma;*" "on *Cyrtandraceæ, a new Natural Order of Plants;*" and lastly "*An Account of the Lansium and some other Genera of Malayan Plants.*"

DESCRIPTION OF MALAYAN PLANTS.

(Continued from page 380 of the Botanical Journal.)

LAURUS INCRASSATUS. *W. J.*

Foliis ovato-lanceolatis venosis, pedunculis fructus incrassatis rubris.

Machilus medius, Rumph. Amb. 3. p. 70. t. 41.

Jaring javing tupai. Malay.

Found at Natal, in the Island of Sumatra.

A *Tree*. *Leaves* alternate, petiolate, ovato-lanceolato or lanceolate, acuminate, entire, very smooth, with lateral nerves proceeding from a middle rib; about five inches long. *Petioles* short. *Peduncles* axillary or lateral near the extremity of the branches, shorter than the leaves, supporting a small panicle of flowers. In the flower these peduncles and pedicels are slender and delicate; but as the fruit advances they become very much thickened, fleshy, and red. *Perianth* six-parted. *Stamens* nine, the three inner ones glandular at the base, and somewhat villous; *anthers* opening by longitudinal valves. *Style* short. *Stigma* capitate, angled. *Berry* seated on the incrassated peduncle, and embraced at the base by the divisions of the perianth a little enlarged, about the size and shape of an olive, purple, one-seeded. *Seed* oval, exalbuminous. *Radicle* superior, far within the edge of the cotyledons.

Obs. I have met with another species at Bencoolen, with large leaves from nine to twelve inches in length, in which the pedicels alone are thickened, the peduncles remaining unaltered. In this particular it agrees, perhaps, still better with Rumphius's figure than the plant above described.

TETRANTHERA CORDATA. *W. J.*

Racemis axillaribus, floribus umbellatis enneandris, filamentis pilosis, perianthii limbo sexpartito, foliis cordatis subrotundo-ovatis uninervibus costatis subtus ramulis pedunculis involucrisque ferrugineo-villosis.

West coast of Sumatra.

A moderate-sized *Tree*. *Leaves* alternate, petiolate, cordate, sometimes sinuato-cordate, varying from subrotundo-ovate to oblong-oval, rather acute, smooth above, tomentose, tomentose beneath, nerves proceeding from a middle-rib, veins transverse subreticulate. *Peduncles* axillary, shorter than the leaves, bearing a raceme of involucred umbels. *Involucres* five-leaved, leaflets roundish, tomentose without, deciduous. *Umbels* sessile on the involucre, four to seven-flowered; flowers pedicelled Male: *Perianth* six-parted. *Stamens* nine, hairy, the three inner filaments furnished with large glands. Female: *Perianth* six-parted, segments narrow. Sterile *stamens* nine, the inner three with large double glands; filaments pilose, with long hairs. *Style* one, longer than the stamens. *Stigma* dilated, sublobate. *Berry* oblong, one-seeded.

KNEMA GLAUCESCENS. *W. J.*

Glomerulis axillaribus 2—6-floris, floribus pedicellatis, baccis oblongo-ovalibus subpulverulentis, foliis oblongis sursum attenuatis subtus glaucis, antheris 12—15.

In the neighbourhood of Bencoolen.

A diœcious *Tree*. The young parts covered with rusty down. *Leaves* alternate, short-petioled, oblong, generally rounded at the base, attenuáted upwards, very entire, deep-green and shining above, glaucous beneath, the adult leaves nearly smooth, the young ones furnished with short stellate pubescence on the under surface; lateral nerves simple; about seven inches long by two broad. *Petioles* somewhat rusty, a third of an inch in length. *Stipules* none. *Flowers* two to six, glomerate on a short axillary knob, pedicellate; pedicels as long as the petioles, ferruginously tomentose. A minute branch about the middle of each pedicel. Male: *Perianth* ferruginously tomentose without, deeply three-parted, spreading, segments round-ovate, thick; æstivation valvate. Stamineous column central, slender, expanding at top into a peltate disc, whose edge is divided into twelve or fifteen rays, to the lower surface of which are attached an equal number of two-celled anthers. Female: fruit axillary, generally solitary, hanging, oblong-oval, considerably smaller than an olive, somewhat pulverulent and rusty, bursting into two valves. Nut invested by a thin aril, which is laciniate only at the top. Seed with ruminate albumen.

Obs. The seed has a pungent taste and slightly aromatic smell. Mr. Brown has recognized the propriety of separating *Knema* from *Myristica*.

CONNARUS. *Linn.*

("Those species having never more than one style, and no albumen, belong to *Connarus*, as limited by Dr. Brown. Roxburgh's *Connarus*, however, is a species of *Rouzea*, Aubl. G. A. W. A.")

This genus, with *Cnestis*, has been removed by Mr. R. Brown, from the *Terebinthaceæ* of Jussieu, and formed into a separate and very natural family, under the name of *Connaraceæ*. They are rather a numerous tribe in the Malay Islands, and besides the following species of *Connarus* and *Cnestis*, I have to add the new genus *Eurycoma*, which appears to be sufficiently distinct from both the former. I am doubtful whether the species which I have referred to *Cnestis* really belong to that genus, as they have all smooth capsules with arilled or carunculate seeds, or whether they ought not to be separated from those whose capsules are clothed with prurient hair. Some confusion appears also to have existed between the species of *Cnestis* and *Connarus*, the ripe capsules of the former being often solitary from the abortion of the remaining ovaries, and I am much inclined to think that *Connarus santaloides* and *mimosoides* of Vahl, in particular, are in reality species of *Cnestis*, a supposition which is supported by the analogy of the inflorescence, which is almost without exception terminal in *Connarus*, and axillary in *Cnestis*. This distinction is of some importance between genera so nearly related.

CONNARUS FERRUGINEA. *W. J.*

Ferrugineo-tomentosa, foliis pinnatis, foliolis oblongis coriaceis subtus ferrugineo-villosis, paniculis terminalibus.

Bunga Burutta, Malay.

Native of Pulo Pinang.

A small-sized *Tree*. *Branches* round, covered with ferruginous wool. *Leaves* alternate, pinnate; leaflets nine, subopposite, oblong-lanceolate, acuminate, very entire, margins reflexed, coriaceous, green and tomentose above, ferruginously villous beneath. *Petioles* round, villous, thickened at the base. *Stipules* none. *Panicles* large, terminal, sometimes with a few axillary racemes. *Flowers* numerous, white. *Bracts* roundish, often curved, ferruginously villous as well as the calyces and the whole panicle. *Calyx* five-parted, laciniæ erect, oblong, acute. *Corolla* white, sprinkled with red dots, five-petaled, longer than the calyx, petals erect, lanceolate. *Stamens* ten, erect, united at the base, the alternate ones much shorter. *Anthers* ovate. *Style* shorter than the long stamens. *Stigma* capitate, three-furrowed. *Capsule* follicular, ferruginous, rather inflated, oblique, gibbous behind, opening on one side, one-celled, one-seeded. *Seed* bean-shaped, appendiculate at the umbilicus. *Umbilical appendage* or *caruncle* large and glandular. *Embryo* dicotyledonous, conform to the seed, without albumen; radicle at a distance from the umbilicus.

Obs. This fine species is well distinguished by its thick leathery leaves and the ferruginous pubescence of their lower surface and of the branches and panicles.

CONNARUS VILLOSA. *W. J.*

Villosissima, foliolis 5—7 lanceolatis longe acuminatis supra glabris, paniculis terminalibus dense stellato-villosis ferrugineis.

Native of Sumatra.

The whole plant densely and ferruginously woolly. *Branches* round. *Leaves* alternate, pinnate, leaflets five or seven, subopposite, oblong-lanceolate, narrowing towards the base, terminating in a long acumen, entire, smooth above, villous beneath, with stellate pubescence, about six inches long. In young leaves the upper surface is covered with deciduous pubescence. *Panicles* large, terminal, and from the upper axils, densely villous, ferruginous. *Bracts* long, linear, thick, curved, villous. *Calyx* five-parted, villous. *Corolla* five-petaled, limb spreading. *Stamens* ten, united into a ring at the base, the alternate ones shorter. *Ovary* densely pilose, with plumose hairs. *Style* longer than the stamens. *Stigma* capitate.

Obs. This plant is covered with denser

and rougher wool than the preceding, particularly on the panicles, and the leaves are much longer, acuminate, and not coriaceous.

CONNARUS SEMIDECANDRA. *W. J.*

Foliis pinnatis, foliolis 3—5 lato-lanceolatis subtus villosiusculis, paniculis terminalibus axillaribusque villosis, filamentis alternis sterilibus.

Mangul, also *Akar Sedinka.* Malay.

Abundant in thickets at various places on the West coast of Sumatra.

It is a small *Tree,* with wrinkled bark; the young shoots and leaves are softly and ferruginously villous. *Leaves* alternate, pinnate; leaflets from three to five, ovate-lanceolate, acuminate, entire, smooth above, slightly villous beneath, nerves lucid; three to four inches long. *Panicles* terminal, or from the upper axils, villous and brownish. *Flowers* numerous. *Bracts* small. *Calyx* five-leaved, erect, reddish, tomentose. *Corolla* of a light bluish colour, five-petaled; petals longer than the calyx, spreading at the limb. *Stamens,* filaments five, fertile, exsert; five alternate ones short, sterile; all united into a ring at the base. *Style* somewhat shorter than the stamens. *Capsule* tomentose, ferruginous, follicular, two-valved, one-seeded. *Seed* with an umbilical *caruncle.*

Obs. This is one of the most common species in Sumatra, and like all the rest of the genus, frequents thickets and copses, or what is called by the Malays, *Belukar,* rather than the great forests.

CONNARUS GRANDIS. *W. J.*

Foliis pinnatis, foliolis quinis ovato-lanceolatis glabris, paniculis terminalibus, capsulis magnis glabris.

At Tappanuly, in Sumatra.

A moderate-sized *Tree.* *Leaves* alternate, pinnate; leaflets generally five, ovato-lanceolate, acuminate, entire, smooth; eight or nine inches long. *Panicles* terminal, long, smooth. *Capsules* large, oblique, red, smooth, follicular, bursting on one side, one-seeded. *Seed* with a large umbilical *caruncle.*

Obs. I have not seen the flowers. It has larger leaves and fruit than any other species that I have met with, and is further distinguished by the smoothness of all its parts.

CONNARUS LUCIDA. *W. J.*

Foliis pinnatis, foliolis glaberrimis nitidis emarginato-acuminatis, paniculis terminalibus ferrugineis, calyce persistente.

Sumatra.

A small *Tree,* with long divaricate subscandent branches. *Bark* brown and wrinkled. *Leaves* alternate; leaflets five to nine, ovato-lanceolate or elliptic-oblong, terminating in a long linear acumen, which is emarginate at the point, entire, very smooth, shining and lucid; two, to two and a half inches long. *Panicles* terminal, small, and delicate, ferruginously tomentose. *Flowers* pale red. *Calyx* five-leaved, tomentose. *Corolla* five-petaled, petals narrow. *Stamens* ten, monadelphous at the base, the alternate ones short. *Style* one, longer than the stamens. *Capsule* obovate, less oblique than usual in the genus, embraced at the base by the enlarged, persistent calyx, smooth, bursting on one side, one-seeded. *Seed* attached nearly at the base, the umbilicus half embraced by the cup-shaped *caruncle,* which is rather smaller than usual.

Obs. This is a small delicate species, having smooth, shining leaves with emarginate points; the panicles are small, and seldom bring more than one or two fruits to perfection.

CNESTIS EMARGINATA. *W. J.*

(" The following species having five styles, some of which are abortive, and no albumen, form part of the genus *Rourea* of Aublet, or *Robergia* of Schreber. *Robergia* of Roxburgh, however, is a true *Cnestis.* G. A. W. A.")

Foliolis 5—7 acuminatis apice emarginatis, racemis axillaribus paucifloris, capsulis solitariis glabris, seminis umbilico carunculâ semiamplexo.

Found in the neighbourhood of Bencoolen.

A small *Tree*, with weak, diffuse branches. *Leaves* alternate, pinnate, leaflets five to seven, from ovate to oblong-ovate, terminating in a long acumen, which is emarginate at the point, entire, very smooth, the middle nerve pubescent underneath; the upper leaflet is the largest, and frequently five inches in length. *Petiole* thickened at top and bottom, almost articulate under the terminal leaflet. *Racemes* axillary, subsolitary, short, few-flowered; *pedicels* alternate, one-flowered; a bractis at the base of each pedicel, small, tomentose as well as the peduncle. *Calyx* five-parted, smooth, persistent. *Corolla* five-petaled, petals oblong, acute. *Stamens* ten, distinct, the alternate ones shorter. *Ovaries* five, smooth, with a line of hairs along the suture. *Styles* five, shorter than the stamens. *Stigmas* emarginate. *Capsule* solitary, four ovaries aborting, embraced at the base by the thickened calyx, orange-coloured, smooth, bursting on one side, containing a single black seed. *Seed* furnished at the base with a cup-shaped, orange-coloured, fleshy *caruncle* which partially surrounds the umbilicus. *Embryo* inverse, without albumen.

Obs. The umbilical caruncle in this species is similar in shape and situation to that observed in the *Connarus lucidus*, being smaller than usual in this tribe.

CNESTIS FLORIDA. *W. J.*

Foliolis 3—5, rarius solitariis, oblongo-ovatis acuminatis glaberrimis, racemis fasciculatis axillaribus, seminibus arillo subinclusis.

Confer cum *Connaro santaloide*, Vahl, anne eadem?

Found in Sumatra and the Island of Pulo Nias.

A small *Tree*, with somewhat rigid, divaricate branches. *Leaves* alternate, pinnate, leaflets three to five, sometimes solitary, oblong-ovate, attenuated into a longish, blunt acumen, very entire, very smooth, rather rigid, shining above, veins reticulate; about three inches long. *Racemes* axillary, fasciculate, slender, shorter than the leaves; the lower pedicel three to four-flowered. *Calyx* almost five-leaved, erect, tinged with red towards the base. *Corolla* five-petaled. *Stamens* ten, distinct, nearly equal; *filaments* flat, and broader at the base. *Ovaries* five, oblong, erect. *Styles* one to each ovary. *Stigmas* simple. *Capsule* solitary, the remainder aborting, ovate, pointed towards both ends, somewhat oblique, smooth, bursting on one side, one-seeded. *Seed* almost enclosed in a bright red fleshy aril, originating from the umbilicus, and in its expansion enveloping the whole seed. *Albumen* none. *Cotyledons* plano-convex, solid. *Radicle* remote from the umbilicus, as in Gærtner's *Omphalobium.*

CNESTIS MIMOSOIDES. *W. J.*

Foliis pinnatis subdecemjugis, foliolis ovali-oblongis emarginatis, seminibus arillo subinclusis.

Connarus mimosoides. Vahl and Willd.

Found at Tappanuly.

I can scarcely entertain a doubt of this being the very plant referred by Vahl to *Connarus*, and aptly named *mimosoides*. Its analogy with the preceding is very close, having the seeds similarly enclosed in a large red aril, and the racemes axillary. I have not seen the flowers, but the four abortive ovaries are quite distinct at the base of the perfect one. In all these three species only one capsule ripens, in which particular, as well as having smooth capsules and arilled seeds, they seem to differ from *Cnestis*.

EURYCOMA. *W. J.*

Pentandria Monogynia.—Nat. Ord.

Connaraceæ. *Brown.*

Calyx 5-partitus. *Corolla* 5-petala. *Stamina* quinque. *Glandulæ* decem staminibus alternæ. *Ovarium* 5-lobum, lobis monosporis. *Stylus 1. Stigmata* quinque. *Capsulæ* 3—5-folliculares glabræ, monospermæ. *Semen* nudum. *Polygama*, foliis *pinnatis fastigiatis*, floribus *paniculatis*.

(" I have very great doubts of this belonging to the natural order of *Connaraceæ*. I rest particularly on the combined carpels

which contain each only one ovule. In addition, the ovarium is five-lobed, and points out an affinity with the great family of *Rubiaceæ*—indeed I feel much disposed to combine *Eurycoma* with that sub-order of *Xanthoxyleæ*, which I have called *Ailantheæ*, comprehending *Brucea* and *Ailanthus*; both of which have solitary ovules, and the albumen (if it may be so called) reduced to a mere plate or inner coat to the seed. G. A. W. A.")

EURYCOMA LONGIFOLIA. *W. J.*

Kayu Kabal, Malay.

Found at Tappanuly and Bencoolen, in Sumatra, and at Singapore.

This is a small *Tree*, whose branches are thick, rough with the vestiges of fallen leaves, and foliose at their summits. *Leaves* crowded at the extremity of the branches, two feet long, pinnated with numerous leaflets, which are oblong-lanceolate, acute, very entire, very smooth; two to three inches in length. *Panicles* axillary, very long. *Flowers* male and hermaphrodite on different plants. *Calyx* small, five-parted. *Corolla* longer than the calyx, purple, without tomentose with glandular hairs, petals erect, with inflexed margins. *Stamens* five, erect, shorter than the petals, alternating with five pair of villous corpuscules, which are large and distinct in the male flower, very small in the hermaphrodite. *Ovary* five-lobed, lobes monosporous; in the male very small and abortive. *Style* one, short, curved. *Stigmas* five, thick, recurved. *Capsules* from three to five, nearly ovate, smooth, bursting on one side, one-seeded. *Seed* naked (without *aril* or *caruncle*) exalbuminous.

Obs. The corpuscles interposed between the stamens are remarkable in the male flower, being roundish, erect, yellow bodies with somewhat the appearance of abortive anthers; in the hermaphrodite, however, they become simple scales. The genus differs from *Cnestis* in the number of the stamens, the single style, and the smoothness of the capsules; and from *Connarus* in the number of the ovaries and stigmas and the want of the umbilical caruncula.

PERONEMA. *W. J.*

Didynamia Angiospermia.—Nat. Ord. Verbenaceæ. *Br.*

Calyx 5-partitus. *Corolla* tubo brevi, limbo irregulari 5-lobo, laciniis secundis. *Stamina* duo, exserta; rudimenta duorum sterilium. *Stigma* refractum. *Fructus* siccus, 4-partibilis, 4-spermus.—Arbor, foliis *pinnatis petiolo alato*, paniculâ *terminali opposite corymbosâ*.

PERONEMA CANESCENS. *W. J.*

Sunkei. Malay.

A large tree, native of Sumatra.

Trunk straight, but little branched; *leaves* opposite, pinnate, nearly two feet long, with seven to nine pairs of leaflets, which are alternate or sub-opposite, lanceolate, attenuated to both ends, acute, somewhat recurved, entire, smooth above, canescent beneath, veins reticulate on the under surface, eight to nine inches long. *Petioles* winged, finely and delicately tomentose, wings decurrent from the insertion of the leaflets. *Stipules* none. The branches are crowned by a vast terminal, oppositely corymbose panicle, of which the ultimate divisions are dichotomous, with a flower in the bifurcations; the whole is finely tomentose and hoary. *Bracts* small, acute. *Flowers* inconspicuous, whitish. *Calyx* five-parted, segments acute, erect. *Corolla* not much longer than the calyx, limb expanding, irregular, five-lobed, segments secund, the two upper ones diverging, the lowermost considerably longer than the rest. *Stamens* two, reflexed backwards, between the upper segments of the corolla; *filaments* subulate, thickened towards the base; *anthers* long. *Rudiments* of two abortive stamens. *Ovary* four-celled, ovule erect. *Style* rather longer than the stamens. *Stigma* simple, refracted. *Fruit* seated on the calyx, villous, dry, separating into four portions, each of which contains a single seed.

Obs. This is a valuable timber-tree, the wood being hard and tough, well suited for carriage-shafts, which require to combine strength and elasticity with lightness.

When long buried in the earth, it is said to become petrified. The genus is related to *Vitex*, but is abundantly distinct therefrom.

RHODAMNIA. *W. J.*

ICOSANDRIA MONOGYNIA.—Nat. Ord. MYRTACEÆ.

Calyx superus, quadrilobus. *Corolla* tetrapetala. *Stamina* numerosa. *Ovarium* uniloculare, pluri-ovulatum, placentis duobus parietalibus. *Bacca* unilocularis oligosperma.—Arbuscula, foliis *trinerviis, inflorescentia axillari.*

RHODAMNIA CINEREA. *W. J.*

Frequent on the Western coast of Sumatra, and the islands which skirt it. Its Malay name is *Marpuyan.*

There are two varieties of this species, the one of which is larger than the other, and has broader leaves which are more decidedly tomentose below. These differences are scarcely sufficient for a specific distinction.

A small *Tree,* with greyish, wrinkled bark and pilose branchlets. *Leaves,* opposite and alternate, petiolate, roundish-ovate in the large variety, and broadly lanceolate in the small one, acuminate, very entire, three nerved, often with a less distinct pair near the margin, smooth above, somewhat hoary beneath, pubescent, particularly on the nerves; but in the small variety, nearly smooth, with little more than a glaucous tinge on the under surface. *Petioles* short, tomentose. *Stipules* small, linear. *Peduncles* short, axillary, one-flowered. *Flowers* white. *Calyx* tomentose, persistent. *Corolla* twice as long as the calyx. *Stamens* inserted on the calyx, almost as long as the corolla. *Ovary* one-celled, containing many ovules attached to two parietal placentæ. *Style* one, erect. *Berry* reddish, subglobose, crowned with the calyx, one-celled, containing a few seeds attached to the parietes, many of the ovules proving abortive.

OBS. This genus, which is nearly related to *Myrtus,* appears to be sufficiently distinguished by its ovary and placentation, from which, rather than from the fruit, the most important characters in this family are to be derived. It is peculiar in having three-nerved leaves, in which particular it has a resemblance to *Myrtus tomentosa,* but differs widely from that species in its fruit and ovary.

ADINANDRA. *W. J.*

POLYANDRIA MONOGYNIA.

Calyx 5-partitus, persistens, basi bibracteatus. *Corolla* pentapetala, petalis basi latis. *Stamina* 30, pluriseriata, subpolyadelphia, interioribus brevioribus; antheris bilocularibus apice mucronatis. *Stylus* unicus, subulatus. *Bacca* supera, stylo persistente acuminata, 5-locularis, polysperma, placentis ab angulo interiore loculos bipartientibus.—Arborescens, foliis *alternis exstipularibus,* floribus *axillaribus.*

"Dr. Wallich refers this, (*List of East India Plants, No.* 2245,) doubtfully to *Ternstrœmia.* I have great hesitation in considering any of the East Indian species so called, to belong to that genus; but as to *Adinandra,* Jack would unquestionably have taken notice of the petals being opposite to the sepals, which ought to be the case in *Ternstrœmia.* Taking the whole of Jack's character into view, I can scarcely say how his genus differs from *Cleyera.* The anthers not being hirsute is no character, Dr. Wight and I having lately described one, from the Peninsula, with these organs glabrous. *G.A.W.A.*"

ADINANDRA DUMOSA. *W. J.*

Daun Saribu, Malay.

Abundant in thickets throughout Sumatra, and various parts of the Malay islands. It grows to be a small *Tree;* the bark is dark brown, and the branches are smooth. *Leaves* alternate, shortly petioled, elliptic-oblong, acute at both ends, sometimes rounded with an obtuse acumen at top, entire or obsoletely serrate, smooth, slightly glaucous beneath, almost veinless, three to four inches long. *Stipules* none. *Peduncles* axillary, subsolitary, one-flowered, shorter than the leaves, recurved.

Calyx bibracteate at the base, five-parted, segments thick, subrotund, over-lapping each other. *Corolla* white, twice as long as the calyx, erect or conniving, five-petaled, petals ovato-oblong, broad at the base, acute. *Stamens* about thirty, closely arranged in several circles, the inner ones shorter; *filaments* divisible to their bases, but closely pressed against each other, sericeously pilose, particularly on their outer side; *anthers* of two parallel lobes, adnate to the sides of the filament, which is prolonged into a mucro at the summit. *Ovary* superior, smooth, five-celled, polysporous; the cells are almost biparted by placentæ, which project from the inner angle, and to whose edges the ovules are attached. *Style* single, subulate. *Stigma* simple. *Berry* globose, embraced at the base by the calyx, and acuminated by the persistent style, five-celled, many-seeded.

Obs. In general habit and in the texture of the leaves, this plant has some resemblance to *Diospyros*, but differs widely in fructification.

IXONANTHES. *W. J.*

Calyx 5-passim 6-partitus, foliolis subrotundis. *Corolla* 5 v. 6-petala, glutinosa. *Stamina* 10 vel 20. *Nectarium* germen ringens. *Stylus* 1. *Capsula* supera, calyce corollaque persistentibus cincta, ovato-acuminata, 5-locularis, 5-valvis, valvularum marginibus introflexis. *Semina* singulo loculo duo, margini interiori dissepimentorum affixa, compressa, in alam membranaceam producta. *Albumen* semini conforme embryone inverso foliaceo, plano.—Arbores, foliis *alternis simplicibus*, floribus *dichotome corymbosis axillaribus*.

IXONANTHES RETICULATA. *W. J.*

Floribus decandris, foliis integerrimis.

Found at Tappanuly, on the West coast of Sumatra.

A *Tree*, with smooth compressed branchlets. *Leaves* alternate, petiolate, elliptic-oblong, emarginate, somewhat attenuated to the base, entire, smooth, firm and rigid, with thick, revolute edges, shining above, rather glaucous beneath, veins reticulate; about three inches long. *Petioles* short, flattened above. *Stipules* minute, deciduous. *Peduncles* axillary on the younger shoots, much longer than the leaves, smooth, dichotomous at the summit, with a pedicel in the bifurcation, bearing generally about seven flowers, which are small and green. *Calyx* five-parted, segments rounded. *Corolla* glutinous as well as the calyx, five-petaled, petals roundish. *Stamens* ten; *filaments* inserted below the petals: *anthers* yellow, two-celled. *Ovary* surrounded at the base by a yellow, fleshy, nectarial ring, five-celled, ten-seeded. *Style* erect. *Stigma* capitate. *Capsule* surrounded at the base by the persistent calyx, and corolla somewhat enlarged, oblong, pointed, smooth, five-valved, five-celled, septa formed by the introflexed margins of the valves, cells two-seeded; but, frequently, only one comes to perfection, they are separated from each other by a ridge which projects from the middle of the valves. *Seeds* compressed, oblong, angular, winged at the lower end. *Albumen* conform to the seed. *Embryo* inverse, central. *Cotyledons* flat, oval. *Radicle* superior, cylindrical, not so long as the cotyledons.

IXONANTHES ICOSANDRA. *W. J.*

Floribus icosandris, foliis crenatis.

Found in the interior of Bencoolen.

A *Tree*. *Leaves* alternate or scattered, short petioled, lanceolato-oblong, emarginate dentato-crenate, very smooth, shining above; about six inches long. *Stipules* small, deciduous. *Peduncles* axillary, nearly as long as the leaves, bearing a trichotomous umbel or corymb of greenish flowers. *Bracts* small. *Calyx* five to six-parted. *Corolla* five to six-petaled, glutinous as well as the calyx, petals spreading, subrotund, pale and somewhat transparent. *Stamens* twenty, much longer than the corolla. *Nectarial ring* crenate on the margin by the compression of the filaments, which are inserted round it. *Ovary* five to six-celled, each cell containing two

ovules. *Style* a little longer than the stamens. *Stigma* capitate. *Capsule* ovate, pointed, smooth, five to six-celled, five to six-valved, margins of the valves introflexed. *Seeds* two in each cell, attached by their middle to the inner ridge of the valvular partitions, oblong, membranaceous at both ends, bifid at the lower.

CHIONOTRIA. *W. J.*

DECANDRIA MONOGYNIA.

Calyx 5-partitus inferus. *Corolla* 5-petala. *Stamina* 10, erecta. *Ovarium* 2-loculare 2-sporum, ovulis pendulis. *Stylus* 1. *Stigma* capitatum. *Bacca* monosperma. *Semen* exalbuminosum apice umbilicatum; cotyledonibus maximis convexoplanis, radiculâ superâ minimâ.—Frutex, foliis *simplicibus oppositis pellucido-punctatis*, racemis *axillaribus.—Genus* Aurantiis *affine*.

CHIONOTRIA RIGIDA. *W. J.*

Native of Pulo Pinang.

A *Shrub*, with corrugated grey bark. *Leaves* opposite, very short petioled, ovato-lanceolate, acuminate, narrow at the base, very entire, very smooth, pellucidly punctate. *Stipules* subulate, acute. *Racemes* axillary, erect, rigid, branched, strict, shorter than the leaves; *pedicels* short, rigid, many-flowered *Flowers* greenish, inconspicuous. *Bracts* very small. *Calyx* very small, five-parted. *Corolla* little longer than the calyx, five-petaled. *Stamens* ten, exsert, erect; *anthers* incumbent. *Ovarium* superior, two-celled, two-seeded, *seeds* pendulous. *Style* thick, as long as the stamens. *Stigma* capitate, obtuse. *Berry* of the size of a cherry, snow-white, globular and somewhat flattened, umbilicate, consisting of a spongy, farinaceous pulp, and containing a single large, round seed. *Seed* globose, attached superiorly and there umbilicate. *Integument* coriaceous, marked with veins which diverge from the umbilicus. *Albumen* none. *Embryo* inverse, conform to the seed. *Cotyledons* plano-convex, of a deep green colour, somewhat rugose externally, and punctate on the inner surface. *Radicle* superior, obverse to the umbilicus, short, straight, cylindrical, obtuse, covered with ferruginous down. It is elongated into a short, conical plumule.

SPHALANTHUS. *W. J.*

DECANDRIA MONOGYNIA.—Nat. Ord. COMBRETACEÆ. *Br.*

Calyx tubulosus, hinc gibbus, deciduus, limbo 5-partito. *Corolla* 5-petala, summo tubo calycis inserta et ejusdem laciniis alterna. *Stamina* 10, corolla breviora. *Stylus* tubo calycis hinc accretus. *Ovarium* uniloculare, ovulis paucis ab apice loculi pendulis. *Capsula* 5-alata, monosperma, semine 5-angulato. *Semen* exalbuminosum, cotyledonibus convexo-planis, radicula minimâ conicâ.

SPHALANTHUS CONFERTUS. *W. J.*

Kayu Sumang, Malay.

A *Shrub*, with round nearly smooth branches. *Leaves* generally alternate, large and reflexedly bifarious, short petioled, ovato-oblong, acuminate, subcordate at the base, entire, very smooth. *Petioles* short, somewhat recurved. *Stipules* none. *Spikes* one to three, terminal, bending in an opposite direction from the leaves. *Flowers* crowded, sessile. *Bracts* lanceolate, acute, much shorter than the flowers. *Calyx* superior, very long, tubular, gibbous on one side below, reddish and somewhat tomentose without, limb five-parted, somewhat reflex, laciniæ acute, broader at the base. *Corolla* five-petaled, white at first, becoming red after expansion, a little longer than the calyx, petals ovato-oblong, acute. *Stamens* ten, inserted in a double series on the calyx, erect, shorter than the corolla; *anthers* oblong, yellow. *Ovary* small, oblong, one-celled, containing three pendulous ovules, attached by filaments to the summit of the cell. *Style* green, filiform, rather longer than the stamens, adhering to or concrete with the tube of the calyx, on one side, along its whole length. *Stigma* simple. *Capsule* large, not crowned with the calyx, oblong, with five membra-

naceous wings, smooth, one-celled, one-seeded. *Seed* oblong, with five obtuse angles. *Integument* membranaceous, easily separated. *Albumen* none. *Embryo* conform to the seed. *Cotyledons* plano-convex, angled exteriorly. *Radicle* conical, very small.

Obs. The structure of the seed is here different from what generally obtains in the *Combretaceæ*, the cotyledons being solid, not convolute.

PYRRHANTHUS. *W. J.*

Decandria Monogynia.—Nat. Ord. Combretaceæ. *Br.*

Calyx 5-fidus, superus, persistens. *Corolla* 5-petala, calyce longior. *Stamina* 5—10, erecta, corollâ duplo longiora. *Ovarium* uniloculare, ovulis 3—5, pendulis. *Drupa* caryophylliformis, calyce coronata; nuce oblongâ monospermâ.—Arbor *littorea inter* Rhizophoras *crescens;* foliis *crassis ad apices ramorum confertis,* floribus *subcorymbosis.*

PYRRHANTHUS LITTOREUS. *W. J.*

Mira buta. Malay, and in Sumatra, *Kayu Api-api.*

Native of Sumatra, and in the Malay Peninsula, growing among Mangroves in salt swamps, and near the mouths of rivers. It is one of the most ornamental trees that occur in these situations.

It grows to be a large *Tree,* generally with an irregular, crooked trunk. *Leaves* irregularly crowded at the extremities of the branches, which are rough with their persistent vestiges, subsessile, cuneiform, retuse, attenuated at the base into a very short petiole, obtusely crenate, often nearly entire, smooth, thick and fleshy, almost veinless. *Stipules* none. *Racemes* short, simple, terminal, subcorymbose. *Flowers* pedicellate, crowded. *Bracts* two, small, acute, at the base of each flower. *Calyx* superior, five-cleft, segments erect, thick, rather obtuse. *Corolla* crimson, five-petaled, petals spreading, twice as long as the calyx, acute. *Stamens* varying in number from five to ten, erect, twice as long as the corolla; *filaments* red, subulate; *anthers* oblong, purple, attached by the middle. *Ovary* inferior, about the size and shape of a clove, one-celled, containing from three to five ovules, which are pendulous from the top of the cell. *Style* one. *Berry* or *drupe* somewhat compressed, obtusely angled, crowned by the thick, persistent calyx; *nut* oblong, with two prominent angles, one-seeded. *Seed* exalbuminous. *Embryo* inverse. *Cotyledons* convolute.

Obs. The number of the stamens is very variable, seven is perhaps the most frequent; five and six are common, but ten, the complete number, is rare. The number of ovules varies also. The genus is most nearly related to *Laguncularia,* of Gærtner, but seems to differ in its corolla and stamens. It has some resemblance to *Kada Kandel,* Rheed. H. Mal. VI. p. 67. *t.* 37, a figure which has not, I believe, been quoted, and may possibly be another species of this genus. *Kayu Api-api* is the name generally given to this tree in Sumatra, but is applied by Rumphius to his *Mangium album, Herb. Amb.* III. *pt.* 115, *t.* 66, which is a species of *Avicennia,* probably the *A. resinifera* of Forster, known in Sumatra by the name of *Pelandok Kayu.* It appears to be distinct from *A. tomentosa,* having lanceolate, acute leaves, white beneath, but not tomentose, and the fruit being much smaller.

PHALERIA. *W. J.*

(Octandria Monogynia.)

Perianthium coloratum, tubulosum, inferum, limbo 4-partito. *Stamina* 8, exserta. *Ovarium* biloculare, 2-sporum, ovulis pendulis. *Stigma* capitatum. *Bacca* bilocularis, disperma. *Semina* exalbuminosa, embryone inverso. — Frutex, *foliis suboppositis,* floribus *axillaribus.* This genus is related to the *Thymelææ,* but differs in having a bilocular ovary and fruit.

PHALERIA CAPITATA. *W. J.*

Native of Sumatra.

A *shrub,* with smooth branches. *Leaves*

opposite, or subopposite, short-petioled, ovato-lanceolate, terminated by a long sharp acumen, entire, very smooth; eight inches long. *Petioles* thickened. *Stipules* none. *Peduncles* axillary, sometimes from the axils of fallen leaves, very short, bearing a head or umbel of sessile flowers, which is embraced by an involucre composed of several oblong-ovate leaflets or bracts. *Flowers* large and white, resembling those of the Jasmine. *Perianth* inferior, tube long, faux pervious, smooth, limb four-parted, segments ovate. *Stamina* eight, inserted on the faux, exsert, rather long; *anthers* two-lobed. *Ovary* embraced by a thin, white, nectarial cup, oblong, attenuated into a style, two-celled, cells monosporous, ovules attached to the summit of the cell by a thread, which passing along the back of the ovule, is inserted into its base, so that the ovule seems as if doubled upon its filament. *Style* a little shorter than the stamens. *Stigma* capitate, papillous. *Berries* crowded, somewhat pear-shaped, rounded above, acute at the base, cortical, two-celled, two-seeded. *Seed* exalbuminous; *embryo* inverse; *cotyledons* plano-convex; *radicle* small, superior.

PTERNANDRA. *W. J.*

OCTANDRIA MONOGYNIA.

Calyx ovatus, limbo quadridentato. *Corolla* 4-petala. *Stamina* 8, antheris introflexis, compressis, basi postice calcaratis, bilocularibus, loculis longitudinaliter dehiscentibus. *Ovarium* calyci infra adnatum, 4-loculare, polysporum, placentis parietalibus. *Stylus* declinatus. *Bacca* polysperma.—*Habitus* Metastomarum, foliis *oppositis trinerviis, floribus paniculatis.*

PTERNANDRA COERULESCENS. *W. J.*

Native of Pulo Pinang.

A large, smooth *Shrub*, with round branches. *Leaves* opposite, shortly petioled or subsessile, ovate, acuminate, tapering at the base into the short petioles, very entire, very smooth; coriaceous, paler beneath, with three strong nerves, and two less conspicuous ones along the margins; the transverse veins are few and not prominent. *Stipules* none, but the petioles are connected by an interptiolar line. *Panicles* oppositely corymbose, short, terminal, sometimes also from the upper axils. *Peduncles* four-sided, smooth. *Bracts* small. *Calyx* united to the ovarium beneath, ovate, reticulately squamous, almost entire or obsoletely four-toothed. *Corolla* blue, lighter at the margin, four-petaled, *petals* ovate, acuminate, inserted into the calyx. *Stamens* eight, blue; *filaments* nearly erect, incurved at the apex. *Anthers* large, pointing inwards, compressed, elongated behind into an acumen or spur, cells anteriorly gibbous, and bursting longitudinally. The anthers, before expansion, are turned downwards, as in the *Melastomeæ*, but their points do not reach much below the top of the ovary. *Style* declinate, about as long as the stamens. *Stigma* conical and rather obtuse. *Ovary* adnate to the calyx, four-celled, polysporous, ovules attached to convex parietal placentæ. *Berry* four-celled, many-seeded.

OBS. In general habit and appearance, this plant has a close resemblance to my *Melastoma glauca*, and at first sight appears only to differ in its smaller flowers, and leaves with less distinct nerves and veins. In the structure of the anthers, however, it differs essentially from *Melastoma*, and has some affinity to *Memecylon;* in fruit and mode of placentation, it differs from both. The ovary might either be considered inferior, or superior and adnate to the calyx; the analogy of *Melastoma* has led me to assume the latter.

(To be continued.)

BOTANICAL INFORMATION.

(Continued from p. 121.)

The Rev. M. J. Berkeley, who has now completed the descriptions of the *Fungi* of this country, for the last part of the *English Flora*, has nearly ready for publication a work entitled "*British Fungi, consisting of dried specimens of the species described in Vol. V. Part II. of the English Flora;*" together with such as

may be hereafter discovered indigenous to Great Britain." The first Fasciculus will appear in March, and each Number will contain, at least, fifty species, with their names and references to the Flora now mentioned. The number of copies, owing to the difficulty of procuring specimens of many of the rarer kinds, will necessarily be limited. The publishers are Messrs. Longmans and Rees, and the work will appear half-yearly.

ANOTHER HEATH FOUND IN IRELAND.

It is not many years since we had the pleasure of announcing the discovery, by our valued friend, J. T. Mackay, Esq., of the *Erica Mediterranea*, or, at least, a variety of that species, in Cunnamara. Anxious that the *Flora Hibernica*, which Mr. Mackay has now in the press, should contain as complete a list of Irish Plants as possible, the author has not only zealously investigated different parts of the country himself, but successfully encouraged others to do the same, and among them the son of the innkeeper (Macalla) at Roundstone, Cunnamara, who was a school-boy when Mr. Mackay detected the *E. Mediterranea*, in his neighbourhood, in 1829. Since that period, he has become much attached to Botany and Natural History in general, and has rewarded the encouragement bestowed on him, by communicating to Mr. Mackay an *Erica*, found within a few miles of the station of the *E. Mediterranea*. "The plant I send you," says Mr. Mackay, in his letter to me, "resembles most, in size, mode of growth, and form of its leaves, which have glandular hairs, *Erica ciliaris:* in the disposition of its foliage and flowers, however, it is quite different; the former being arranged pretty generally in fours, or occasionally in fives, in a whorl, and in the flowers which are in terminal small umbels. The corolla, which is shorter than that of *E. ciliaris*, is not" (I should rather say, is less) "contracted at the limb." All these are certainly characters of a Heath quite at variance with any that has been hitherto detected in Ireland, and it therefore proves a most interesting addition to the Flora of that country.

This same plant, however, or one varying only so slightly from it as to be almost *identical* with it, has been found by H. C. Watson, Esq. on Downs near Truro, while gathering the *Erica ciliaris;* and I confess I am disposed to concur in the opinion of that intelligent Botanist, that it is a hybrid between *E. ciliaris* and our cross-leaved Heath, *E. Tetralix:* it does seem so completely intermediate in character between the two. Should this idea be correct, we may expect that the true state of *E. ciliaris* will also be found in Cunnamara, and we have already requested that it may be searched for. Should *E. ciliaris* not prove to be an inhabitant of that country, then the plant in question may, with the more propriety, be deemed a distinct species. In this case, we think every Botanist will agree with us in saying, it ought to bear the name of *E. Mackaii*, in compliment to a most meritorious Botanist of long-standing, who has pre-eminently advanced the Botany and Horticulture of Ireland.

VIOLA LUTEA. *Huds. Sm.*

We wish some Botanist, resident in London, would compare specimens of the well-known *Viola lutea* of our mountain-pastures of the North, with the *V. grandiflora* of the Linnæan Herbarium, and settle the long-disputed point as to their identity. Smith says, in the last opinion he gave on the subject, (Eng. Flora, v. 1. p. 306,) under *V. lutea*, "Great confusion has existed between this very distinct species and the Linnæan *V. grandiflora*, whose flowers are twice as large, and the spur twice as long as the posterior lobes of the calyx; whereas in *V. lutea* those parts are of the same length." On sending specimens of our *V. lutea* to M. Gay, of Paris, at that gentleman's particular request, he has pronounced them to be "identical with *V. Sudetica*, which is the true *V. grandiflora* of Linnæus."

The following observations upon *Viola tricolor* and *V. grandiflora*, L., published by M. Gay, in the twenty-sixth volume of

the *Annales des Sciences Naturelles,* may not be unacceptable to those Botanists of our country, who desire to know the opinions of a very accurate observer, on the subject of the limits of these two species.

"*Viola tricolor,* L.—Most authors consider this plant as either annual or biennial; but it is monocarpous only in sandy or cultivated soil. Schlechtendahl has already made this observation on the *V. tricolor* of the neighbourhood of Berlin, (*Fl. Berol.* 1. *p.* 135.), and I myself possess specimens of the variety *alpestris,* native of the Pyrenées and the Mountains of the Lozère, where the root bears the remains of old stems, which evidently prove a former flowering-season. I am, however, far from supposing that the plant is perennial, even in heavy soil, but it is certainly in the number of those which Fries (*Novit. Fl. Succ. ed.* 2. *p.* 123), terms *perennant* in opposition to *perennial,* and which flower, at least, two successive years, without being of unlimited duration. Such are *Cerastium triviale, Diplotaxis viminea, Herniaria hirsuta* and *glabra, Sagina procumbens, &c.* The *Viola tricolor* is also peculiar in its stems, in its stipules, and its flowers. The former are angular, generally few in number, simple, erect, elongated, many-flowered, with intermediate joints often much longer than the leaves. The blossoms vary to an extraordinary degree, both in size and colour: but, amidst all these variations, the spur is always short, scarcely exceeding the calycine appendages in length. The leaves, which are constantly crenulated, are either notched into a heart-shape at the base, or lengthened more or less gradually into a petiole; they are either reniform, oval or oblong, or even lanceolate, and these several modifications may be observed on the same stalk, the shorter forms growing on the lower part of the plant, and the more elongated ones on the upper part. The inferior stipules are very often undivided, or even exactly similar to the leaf, (*V. Kitaibeliana,* R. & S.) The upper ones, on the contrary, are always oblong and deeply laciniated on both sides, towards the leaf, with one or two linear lobes, upright or but little expanded, the superior one always much exceeded by the top of the stipule, the inferior one always more or less distant from the base of this same stipule; on the exterior side of five or six lobes, sometimes reduced to three or four, the superior one linear, upright or but little expanded, always exceeded by the top of the stipule, the others gradually a little shorter and narrower, but much expanded, the inferior one always well marked, always subulate and reflected, always setting off from the very base of the stipule. As for the summit of the stipule, (the terminal lobe,) it is always spathulate; and more or less similar to the leaf, though never notched into a heart-shape at the base; it is frequently marked by two or four notches; and is never found perfectly entire, but in the upper stipules of the dwarf varieties. All these lobes are united by a large membrane, and it may be said, in few words, that the stipule is spathulate, with a base which is enlarged and pinnatifid on the exterior side, and with diverging lobes. Such is the *Viola tricolor,* which is common in the Pyrenées, and which in the plains, begins to flower so early as the month of March."

"*Viola grandiflora,* L.—This plant has been described by Linnæus (*Mant. Prim. p.* 120) in a very characteristic manner, and stated to be a native of the Alps and Pyrenées; and those authors, who, on the faith of the Linnæan Herbarium, have regarded the *V. grandiflora* as a synonym of *V. Altaica,* can surely never have read the article to which I allude. It is described under the name of *V. grandiflora* in *Vill. Dauph.,* in *De Cand. Fl. Fr.* and *Gaud. Fl. Helv.*—It is also the *V. lutea, De Cand. Fl. Fr. Suppl.,* of *Mert. and Koch, Deutsch. Fl.,* and probably of the English authors. Likewise it is the *V. Calaminaria,* Lig., the *V. Sudetica,* Willd. and of *Enum. Ging. in De Cand. Prodr.*—the *V. Villarsiana, Rœm. and Schult. Syst. Veg.,* the *V. lutea, δ. grandiflora, Reich.* and the *V. tricolor, Balb. Fl.*

Lyonn. (at least so far as regards the plant of Mount Pilatus). Finally, I unite with it, as not possessing sufficiently discriminating characters, the *V. Orcades, Marsch.*, and of *Ging. in De Cand. Prodr.*, as well as the *V. declinata, Gaud. Fl. Helv.* and *V. tricolor, δ. declinata, Ging. l. c.*—These various synonyms belong to the several forms which are dispersed throughout Europe, from Scotland to Calabria, from the Pyrenées to the Riesengebirge and the Mountains of the Crimea. Some grow on the plains, others at a considerable elevation on the mountains. They have not all the same aspect, but it is impossible to make of them more than one species, when there are sufficiently good specimens for examination. All have a perfectly perennial root, stiff and filiform stems which are naked below, and stipules whose larger and constantly quite entire lobe never assumes an elliptical or an oval form. It is in this respect, alone, that *V. grandiflora* differs from *V. tricolor* and *hispida,* with which it possesses in other points a great affinity, because of its generally elongated stems, distinct knots and stipules, which are deeply pinnatifid at their base. The *V. grandiflora* varies to an unlimited degree in other respects; the stems may be more or less elongated, upright or ascending, or prostrate, few or much tufted, simple or (as in the *V. declinata, Gaud.*) branched, glabrous or hispid:—in having the upper leaves sometimes oval, sometimes oblong, sometimes lanceolate; in its flowers, of which the diameter varies from six to eighteen lines; by its petals being sometimes very broad, sometimes very narrow, either all yellow, all purple or lilac, or mixed of both hues; the lower petal being occasionally slightly rounded, or sometimes truncate or retuse, and distinctly notched; in its spur being straight or accidentally hooked, stiff and pointed, or dilated and obtuse, scarcely exceeding the calycine appendages, or almost equalling, in length, the petal which produces it, being from two to six lines long; finally, by its sepals being glabrous or ciliated, entire or occasionally denticulate. Most of these varieties may be seen wherever *V. grandiflora* grows; but it is especially in Auvergne, and on the mountains of the Lozère and on the Pyrenees, that I have seen the spur passing from extreme smallness (the general habit of *V. grandiflora*) to an extraordinary length. The Pyrenean plant always forms a thick herbage; its stems are numerous, simple, prostrate or ascending, and hairy above, as well as the foliage; the flowers are never yellow, and the spur, which is constantly stiff, is neither dilated nor hooked at the extremity. I may be allowed to insist on these peculiarities, trifling as they are in themselves, because more than a hundred Pyrenean specimens are before my eyes at the very time when I write this description. Some come from the Mountain Batera, in the Canton of Arles, where La Peyrouse found the *V. hispida;* others from the port of Peyresourde, between the Valley of Aure and that of Luchon, the locality cited by La Peyrouse for his *V. Cenisia, γ.* The greater part were gathered by M. Xatart, in the territory of Prats de Mollo, in the place called the Solana de la Martra, where the *V. cornuta* is said to have been found. These habitats are interesting, as they show that La Peyrouse has made *three* species out of the specimens of *one,* a fact confirmed by M. Xatart, from whom alone M. La Peyrouse had received the plant from Batera, and that from Solana de la Martra. To the synonym of *V. grandiflora,* which I have cited above, must therefore be added the *V. Cenisia, γ. La Peyr.*, (quoad montem Peyresourde); the *V. cornuta, La Peyr.* ib.; (quoad la Solana de la Martra); *V. hispida, La Peyr.*, and *V. calcarata, ξ. decipiens, Ging. in De Cand. Prodr.* I cannot explain how M. de Gingins can have referred this latter plant, (the *V. hispida,* Lap.) to *V. calcarata,* differing essentially as it does by its much cut stipules. As for the rest, all the localities of which I have just been speaking, belong to the subalpine region:—the *V. grandiflora* flowers there in the very beginning of the month of June."

ILLUSTRATIONS OF INDIAN BOTANY.

By Dr. Wight & G. A. W. Arnott, Esq.

(*Continued from p.* 119.)

TAB. VIII.

VITIS CARNOSA. *Roxb.*

Glabra, ramis foliisque junioribus pube densa brevi obsitis, caule compresso striato, stipulis oblongis, foliis trifoliatis sublonge petiolatis, foliolis petiolulatis rotundis ovatis obovatisve acutis v. obtusis, cymis pedunculatis compositis, petalis distinctis, stylo conspicuo, baccis nigris 2—4 spermis.

Cissus carnosa. *Roxb. Fl. Ind. v.* 1. *p.* 409; (*ed. Wall.*) *v.* 1. *p.* 427. *Wight and Arn. Fl. Pen. Ind. Or. v.* 1. *p.* 127.

α. foliolis ovatis acutis acuminatisve.—C. carnosa, *Wall. List, n.* 6018.—V. crenata, *Wall. List, n.* 6021. *e.f.*—C. acida, *Roxb. in E. I. C. Mus. t.* 501.—C. cinerea, *Lam. De Cand. Prodr. v.* 1. *p.* 631. *Spreng. Syst. v.* 1. *p.* 448. *Rheed. Mal. v.* 7. *t.* 9. *Rumph. Amb. v.* 5. *t.* 166. *f.* 2.

β. foliolis ovatis obtusis. *Wight, Cat. n.* 424. 426.—V. crenata, *Wall. List, n.* 6021. *a. b. g.*—V. auriculata, *Wall. List, n.* 6031. *b.*—Cissus carnosa, *Lam. in Vahl, Symb.* 3. *p.* 19. *De Cand. Prodr. v.* 1. *p.* 629. *Spr. Syst. v.* 1. *p.* 499.

γ. foliolis rotundatis (*Tab. Nostr.* 8.) *Wight, Cat. n.* 426. *b.*—V. crenata, *Wall. List, n.* 6021. *c.*—Cissus crenata, *Vahl, Symb.* 3. *p.* 19. *De Cand. Prodr. v.* 1. *p.* 631. *Spreng. Syst. v.* 1. *p.* 449.

δ. leaflets obovate, obtuse. *Wight, Cat. n.* 425.—V. crenata, *Wall. List, n.* 6021. *d.*—Cissus obtusifolia, *Lam.*

DESCR. A climbing, ramous *shrub. Stems* slightly compressed, dark brown, cracked: young *branches* and shoots subflexuose, striated; the *petioles, peduncles,* and *leaves,* villous. *Leaves* petioled, ternate, succulent; *leaflets* orbicular, widely crenate, veined, the lateral ones nearly sessile. *Tendrils* opposite to the leaves, branched. *Stipules* small, scariose, deciduous. *Peduncles* elongated, bearing, near the middle, two opposite, foliaceous *bracteas,* resembling the leaves, except in being opposite and somewhat smaller. *Cymes* trichotomous, between two and three inches across the primary divisions, with a solitary pedicelled *flower* in the forks. *Calyx* four-sided, truncated, entire. After the fall of the corolla, the edge is hid by a cup-shaped, four-furrowed, glandular disk, which at first enlarges, and afterwards becomes incorporated with the fruit. *Corolla: Petals* four, calyciform, concave, deciduous, broad at the base, bent in at the point. *Stamens* four: *filaments* very short; *anthers* large, two-celled. *Corolla* and *stamens* attached to the base of the glandular disk. *Pistil: Germen* superior, hid under the disk. *Style* conical, erect, red. *Stigma* simple. *Pericarp* a two-celled, four-seeded *berry,* which, when ripe, is of a clear shining black colour.

This plant is usually found near water, on banks of tanks and ditches, covering whatever trees or bushes it may chance to grow near. When it cannot find support of that kind, it spreads extensively on the ground. It is to be met with in flower and fruit, the greater part of the year, but is in the highest perfection during the rainy and cool seasons. From the nature of the country, it is common in Tanjore; and less so in other parts of India I have visited. The juice is supposed to be an antidote to the bites of snakes.

TAB. VIII. Fig. 1. Flower. 2. The same, from which the petals and stamens are removed. 3. Transverse section of a berry:—*magnified.*

(To be continued.)

SOME ACCOUNT OF THE USES AND PROPERTIES OF COCA.

Erythroxylon Coca.

Extracted from the Second Volume of the "Reise in Chile, Peru, und auf dem Amazonenstrome," of Dr. Poeppig.

[Mention is made, when speaking of the Travels of Mr. Mathews in Peru, at page 176 of our Botanical Journal, of the extensive use of the *Erythroxylon Coca* among the Miners. The following more extended History of a plant and of a people who em-

ploy it as the Eastern nations do Opium, and those of more civilized countries, Alcohol, cannot fail to be acceptable to our readers. Ed.]

The *Coca* (*Erythroxylon Coca*, of Lamarck) is a shrub of six or eight feet high, and to the eyes of an individual, unpractised in Botany, presents the general appearance of a straight-growing Black Thorn bush; its numerous small white flowers and the pleasing green of its leaves occasioning this similarity. A large plantation of Coca, while in this state, is an agreeable object, though less beautiful than a well-kept Coffee-ground. The frequent stripping of the foliage of Coca soon reduces it to naked brushwood, and it is but slowly that it regains its verdant garb. These leaves, which are gathered and dried with great care, form the object of a brisk trade, and the use of them is as ancient as our first knowledge of Peruvian history; for the rude primitive people received the *Coca* from the Cadmus of the lofty mountains of Titicaca, and wherever the Incas afterwards penetrated, they distributed it as a boon among the conquered nations. To the present day, we see the Indian, stretched out unsociably in the shade, alternately putting some Coca-leaves and some finely-powdered chalk into his mouth. Silently, as unwilling to be disturbed by conversation, he whiles away a good half hour in the enjoyment of this occupation, slowly swallowing the saliva and renewing the masticated leaves by fresh ones; and, while thus engaged, not all the haste and impatience of the traveller, nor even the approach of a heavy storm, can rouse the Indian from this state of intolerable apathy. The servant would instantly quit any white master who attempted to restrain him in this respect, and would sooner bear to be deprived of necessary food, than to employ, in any other manner, the period allotted to the enjoyment of his Coca. Only in quiet retirement, too, is the pleasure unalloyed, it is lost by riding or walking: so that if the traveller would keep his companion in good humour, whether proceeding by boat or by mules, he must, four times a day, consent to these tantalizing pauses, a sacrifice which even the farmers of this country are compelled to make to the infatuation of their workmen. It has never answered to debar a *coquero* (thus is the most intimate companion termed in Peru) from the enjoyment of this vice, for every one declares he would sooner forego the most necessary things; and the appetite for it increases with age, bringing with it many evil consequences. Strangers are amazed at beholding such an infatuated passion for a leaf, which, whether fresh or dry, is only distinguished by a slight scent, possesses no balsamic properties, and when taken in small quantities, has merely a grassy, or at most, a bitterish taste. The difficulty, however, vanishes when the observation of its effect upon others, or one's own personal experience, convinces us that the Coca, by its property of stimulating the nervous system, possesses a power much akin to that of opium. Rude nations have ever sought for artificial excitements, and the lower do a people stand in the scale of intellectual ability, so much the more attractive to them is that means of exhilaration which removes, for a time, the consciousness of a dreary waste within. The American Indians, and especially those of the Peruvian Andes, though surrounded by civilization, are enthralled by a melancholy suspicion of their own deficiencies and inability to improve themselves, whence arises their passion for artificial stimuli, whether supplied by the *Coca* or by the immoderate use of ardent spirits. Under the effect of the former, the habitual dejection of the Peruvian leaves him, and his indolent imagination presents images to his mind, which would never occur to him in his usual condition. If less violent in its first effects than Opium, the Coca is, perhaps, more dangerous from their longer continuance. A series of observations can alone convince the novice of this fact, as without it, the long train of ills which attack the Peruvian would never be traced to their real source. The sight of an inveterate *coquero* suggests the desired expla-

nation. Useless for every active pursuit in life, and the slave of his passions, even more than the drunkard, he exposes himself to the greatest dangers, for the sake of gratifying this degrading propensity. As the stimulus of the Coca is most fully developed when the body is exhausted with toil, or the mind with conversation, the poor victim then hastens to some retreat in the gloomy native wood, and flinging himself under a tree, remains stretched out there, heedless of night or of storms, unprotected by covering or by fire, unconscious of the floods of rain and of the tremendous winds which sweep the forest; and after yielding himself, for two or three entire days, to the occupation of chewing Coca, returns home to his abode, with trembling limbs and a pallid countenance, the miserable spectacle of unnatural enjoyment. Whoever accidentally meets the *coquero* under such circumstances, and by speaking interrupts the effect of this intoxication, is sure to draw upon himself the hatred of the half-maddened creature. The man who is once seized with the passion for this practice, if placed in circumstances which favour its indulgence, is a ruined being. Many instances were related to us in Peru, where young people of the best families, by occasional visiting of the forests, have begun to use Coca for the sake of passing the time away; and, acquiring a relish for it, have, from that period, been lost to civilization, and as if seized by some malevolent instinct, refuse to return to their homes, and resisting the entreaties of their friends, who occasionally discover the haunts of these unhappy fugitives, either retire to some more distant solitude, or take the first opportunity of escaping when they have been brought back to the towns. Indeed the lives of such wretched beings are embittered by the presence of civilized society, where the white *coquero* is shunned as the most dissolute drunkard, and, soon sinking into a semi-barbarous state, and degrading their white hue, which is the natural stamp of a higher class of society, they die a premature death from their excessive use of this intoxicating leaf. An example of this kind fell under my own notice, in an individual who lived with me in the solitary Pampayaco, and unworthily bore the honoured appellation of Calderone. He was of the fairest colour and of very good descent, but, for twenty years, had resided in the montana, where from compassion, he was permitted to inhabit a hut, more fit for a savage than for a white man. Although scarce forty years of age, he was more decrepid than many a person of sixty, and utterly useless for any common purpose of life, as no one could depend on his word. Priding himself excessively, like all Creoles, on his white colour, yet utterly averse to any exertion, the mere idea of a city life, with its accompanying restraints, was hateful to him. As he was a decided *coquero*, he could only be of service when it was practicable to keep this intoxicating herb from him; but when once the passion had irresistibly seized him, which was, at least, every month, he would break through all restraints; and, disappearing in the forest, was lost for many days, after which he would emerge, sick, powerless, and altered. He was of some use to me, as a good and eager sportsman, and, by liberally supplying him with such fine gunpowder as he could not obtain by purchase, I soon gained his perfect confidence and good will. His disposition was generally kind, but any remonstrance against his vices, would throw him into an ungovernable rage. He has frequently assured me, in confidential moments, that he would rather, as he has done for months together, live alone in the midst of some Coca shrubs, in the most solitary spot in the wilderness, depending for support on his fishing-line and gun, than return home to his family at Huanuco. His description of the lovely visions that appeared to him in the forest at night, and of his delicious sensations at such moments, had something in it truly awful. When it rained, he used to cover his half-naked body with the soddened leaves that had fallen from the trees; and, he assured me, that when this wretched substitute for raiment was brought to steam by the warmth of his person, that

he could lie, thus enveloped, for hours, without experiencing inconvenience or cold.

The exciting principle of the *Coca* appears to be of a very volatile nature, and whether the elaborated chemistry of our country will ever be able to ascertain its mode of operation, seems very dubious, as even in its native place, the leaves, where this quality principally resides, after being kept twelve months, become perfectly inert and good for nothing. Apart from the effect undeniably produced on the nervous system by masticating the foliage, its exciting properties must be derived from subordinate causes. Large heaps of the freshly dried leaves, particularly while the warm rays of the sun are upon them, diffuse a very strong smell, resembling that of Hay, in which there is a quantity of Melilot. The natives never permit strangers to sleep near them, as they would suffer violent head-aches in consequence. When kept in small portions, and after a few months, the Coca loses its scent, and becomes weak in proportion. The novice thinks that the grassy smell and fresh hue are as perceptible in the old state as when new, and this is to be expected with the Peruvian, who never uses it without the addition of burnt lime. Without this, which always excoriates the mouth of a stranger, the natives declare that *Coca* has not *its true taste*, a flavour, by the bye, which can only be detected after a long use of it. It then tinges green the carefully swallowed spittle, and yields an infusion of the same colour. Of the latter alone, I made trial, and found that it had a flat grass-like taste, but I experienced the full power of its stimulating principle. When taken in the evening, it was followed by great restlessness, loss of sleep, and generally uncomfortable sensations; while, from its exhibition in the morning, a similar effect, though to a slighter degree, arose, accompanied with loss of appetite. The English Physician, Dr. Archibald Smith, who has a sugar plantation near Huanuco, once, when unprovided with Chinese Tea, made trial of the Coca as a substitute for it; but, experienced such distressing sensations of nervous excitement, that he never ventured to use it again. The Peruvian increases its effects by large doses, utter retirement, and the addition of other stimulating substances. The inordinate use of the Coca speedily occasions bodily disease, and detriment to the moral powers, but still the custom may be persevered in for many years, especially if frequently intermitted; and a *coquero* sometimes attains the age of fifty, with comparatively few complaints. But the oftener these orgies are celebrated, especially in a warm and moist climate, the sooner are their destructive effects made evident. For this reason, the natives of the cold and dry districts of the Andes are more addicted to the consumption of Coca, than those of the close forests, where, undoubtedly, other stimulants do but take its place. Weakness in the digestive organs, which, like most incurable complaints, increases continually in a greater or less degree, first attacks the unfortunate *coquero*. This complaint, which is called *Opilacion*, may be trifling at the beginning, but soon attains an alarming height. Then come bilious obstructions, attended with all those thousand painful symptoms, which are so much aggravated by a tropical climate. Jaundice and derangement of the nervous system follow, along with pains in the head, and such a prostration of strength, that the patient speedily loses all appetite; the hue of the Whites assumes a leaden colour, and a total inability to sleep ensues, which aggravates the mental depression of the unhappy individual, who spite of all his ills, cannot relinquish the use of the herb to which he owes his sufferings, but craves brandy in addition. The appetite becomes quite irregular, sometimes failing altogether, and sometimes assuming quite a wolfish voracity, especially for animal food. Thus do years of misery drag on, succeeded, at length, by a painful death.

In a moral point of view, the custom of chewing Coca is no less deleterious. The propensity for solitude and inaction which it engenders, is productive of many bad consequences, and if the intellectual powers

do not seem to sink so quickly as under the use of ardent spirits, still the effects tend finally to equal degradation. It is fortunate that a thinly peopled region is the only theatre for the *coqueros;* the bustle of a town would ill suit this propensity; besides, public opinion is even more strong against it than gambling or drinking. The stigma of vulgarity attaches so much to a *coquero*, that every white person shuns any intercourse with him, though he always pleads the weakness of his stomach as an excuse for chewing the herb. The Indian alone is considered as privileged to continue this custom, for even the Negro, though fond of strong excitement, does not love Coca: still females of every class are said to be partial to it, and to enjoy it, both in the montana and the towns, though in the greatest secrecy. It is a rare thing for strangers to addict themselves to it, though it is said that the Chilians do so, when coming to reside in the Coca districts, and become even more inveterate Coca chewers than the natives themselves. You may frequently hear the ignorant people, in Peru, speak of this herb as a blessing sent from heaven, and a miraculous plant, to which the greatest virtues are ascribed. Undoubtedly many individuals may use it, without suffering materially, but as its effects of increasing the powers arise solely from exciting the nerves, the result must finally be injurious; and, even those instances of endurance which arise from its use, have been greatly exaggerated. The miner will perform, for twelve long hours, the formidably heavy work of the mine, and, sometimes, even doubles that period, without taking any further sustenance than a handful of parched Maize, but every three hours he makes a pause for the purpose of chewing Coca (*coquear*). He would work ill and reluctantly, if the proprietor let him want his favourite herb, and he exerts himself fourfold, if he is allowed to take brandy along with it, thus heightening, as he says, its pleasing taste. But after quitting such labour as no European could have performed, he requires (provided the Coca has not engendered any disease) as much food as others, and such a quantity of it as might surprize any one, when its miserable nature is considered. The same holds good with the Indian, who, as a porter, messenger, or vender of his own productions, traverses the Andes on foot. Merely chewing Coca from time to time, he travels with a load, weighing 1 cwt., on his back, over indescribably rough roads, and accomplishes frequently ten leagues in eight hours. During the revolutionary war, the undisciplined Patriot troops, chiefly consisting of Indians from the Sierra, by dint of ample supplies of Coca and brandy, traversed long distances in a very short time, and thus became very dangerous to the Spaniards. Where Europeans would have halted and bivouacked, the ill-clad, barefooted Indians merely paused, for a short interval, to chew their Coca. But with all this, the Coca only possesses a stimulating property which is highly dangerous and so fascinating, that, for one who becomes passionately attached to it, there is no escape. Short, too, is the alleviation of misery which it yields to the thousands, whose destruction it procures, so that we may well adopt the opinion of the old Spanish Chronicler, who affirms that "the use of Coca is solely a depraved taste, and worthy only of such beings, as the unhappy Indians now are."

ON THE CULTURE AND CONSUMPTION OF THE COCA.

The native country of the Coca appears to be as little known as that of many other plants which attend on the footsteps of man; I think, indeed, that I have met with it in the environs of Cuchero, on the stony top of Cerro de San Christobal; but though its general aspect differed considerably from the cultivated plant, it is by no means improbable that the seeds may have been dropped by birds. The climate, in general, suits the genus *Erythroxylon*, of which six species occur in its Flora, one of them, namely, the *Wild Mamucuca* of the Indians (i. e. *Coca-mother—Erythroxyli*, n. sp.) is perfectly similar to the true Coca.

The cultivated shrub succeeds best in the mild but very moist climates of the sub-Andes, on elevations between 2,000 and 5,000 feet above the sea, where the mercury does not frequently fall below 15° C. (Centigrade) and where the climate is free from any great and sudden changes. In the province of Huanuco, 9,000 feet above the sea, night frosts sometimes occur, killing the Coca, and where the mean temperature exceeds 20° C., the plants lose their strength, and the dryness of the leaf, which always bespeaks a too warm situation, is accompanied by a want of flavour, which causes it to be rejected by an experienced *coquero*. For this reason the Coca is not cultivated even on the plain parts of Maynas, and the few natives, accustomed to its use, procure it from the more elevated districts. North of Lima, it is extensively grown in the provinces of Huanuco and Guamalies; the former of which maintains a high celebrity for its Coca. Experience proves that it succeeds best on declivities, and little rugged slopes, free, however, from stones, where the earth, of a brick-red colour, probably contains much iron, and may be considered identical with that kind of soil, on which, in the North of Cuba, the natives cultivate the best coffee, and on which, near Havanna, the finest kinds of tobacco are raised. Limestone, again, is very detrimental to the growth of Coca, unless covered with a layer of vegetable soil, and even then, the shrub becomes stunted; and, producing only knotty branches and no leaves, speedily perishes. Swampy land acts even more disadvantageously, and occasions the roots to rot. But as on such varied ground and interrupted surface, the soil changes considerably in a short space, and the natives shun all artificial improvements, the plantations of Coca have a most irregular appearance, and present a total reverse to the beautiful symmetry of a West Indian coffee plantation. In all the warm districts, the usual process of felling and burning the natural wood is practised, which is done at the close of the dry season, after which they proceed to sowing the Coca, the berries having been gathered whenever their ripeness is indicated by the bright scarlet colour. In order to prevent the dry berries being attacked by rottenness, they pick out the decayed ones, and then throw the remainder into vessels of water, rejecting those whose lightness makes them swim, as having been injured by insects. They are deposited in the ground with the greatest exactness and symmetry, the holes being made by a smooth iron, in each hole a handful of seed is put, but not covered with earth, as they would otherwise rot. If sown at the proper time, November, about one hundred plants spring up and grow, and are allowed to remain undisturbed for fifteen or eighteen months, many of them, however, perishing for want of space. In the second week of February, sixteen months after sowing, the young branchless shrubs are transplanted singly to other holes, and ranged, if possible, in straight lines, thus forming the proper plantation, called a *Cocal*. Here the shrub is destined to pass its life, and it receives the customary treatment, which, though not laborious, involves a good deal of attention. It consists chiefly in removing all weeds, and carrying off the water. The weeding should be done at least every three months, and a partial cleansing at the end of every month, because vegetation is here so rapid and vigorous as almost to defy the art of man. Certain plants spring up with incredible celerity, among them some grasses are peculiarly troublesome, namely, *Panicum platycaule*, Poir., *P. scandens*, β. Trin., *P decumbens*, *R.* and *S.*, and *Pennisetum Peruvianum.* A *Drymaria* also grows in the utmost profusion, with some small *Commelinas*, which are very difficult to be eradicated. A Fern that is never seen in the woods, may be considered as the greatest foe to cultivation, wherever mankind goes, it follows him, and resists all attempts to root it out, whether by weeding or by fire. The *Macara* (*Pteris arachnoidea*) grows to the height of a man in less than three months, and so exhausts the soil as to destroy the Coca, while it maintains its own vegetative property, though burnt down to the ground. No less

do climbing plants attempt to extend their sway over the plantations of Coca, into which they insinuate themselves from the neighbouring woods. The labour of removing these various weeds is extreme, and care must be taken afterwards to loosen the soil and render it perfectly level, so that no water may collect in the hollows, and injure the delicate roots. Many people plant Maize in the first year, between the young shrubs, but as this soon exhausts the soil, it is replaced by the useful Bottle Gourd. The time of gathering the leaves depends on the greater or less richness of the soil; on the best land it may take place in three years, but in poorer situations only at five years' end. The full-grown shrub affords a harvest every thirteen or fourteen months, but as the ripeness of the leaves depends very much on situation and the age of the plants, so in large plantations the collecting of them goes on throughout the whole year. The only means of ascertaining the maturity of the leaves is by examining their stiffness; if they bend when taken hold of, they are considered too young, colour and size determining nothing. If, on the contrary, the leaves break, the gathering must not be delayed, or the shrub will throw them off of itself. The mode of gathering them is, to grasp the twigs in both hands, and strip off the foliage with some force, a labour that even wounds the hard skin of the natives. There is a prejudice in favour of drying the Coca in the sun, perhaps arising from the indolence of the people, who resist every thing new. Before each dwelling-house to which a *Cocal* is attached, a place (*Area*) made smooth, is seen, it is either imperfectly covered with a wooden floor, or firmly stamped down, but being exposed to the weather, and a rendezvous for the domestic animals, it is generally in a very bad state. Here the leaves are spread on sunny days to be dried. But in a country where rain is so frequent, that weeks often pass without the sun's appearing, where the sky is often long enveloped in thick fogs and clouds, and the changes of weather are sudden and extreme, such a method of preparing the Coca is very inefficient. The Peruvians, however, are not yet arrived at the idea of building those *Secaderos* in which the Coffee is dryed at Cuba, nor, what would be still better, of employing a moderate and well-regulated degree of artificial heat within small houses erected for the purpose. The greatest vigilance, the utmost despatch in snatching up and carrying away the outspread leaves of Coca, cannot always prevent their being damaged by wet, and sometimes they spoil by being kept within doors, waiting for such weather as would enable them to be laid out. In this way, large sums are annually lost, for when once the leaves turn black, and shrink in consequence of moisture, they become unsaleable, having lost their flavour. If, under peculiarly favourable circumstances, the process of drying is accomplished in one day, the article is esteemed the best, and is eagerly sought for, and fetches a high price. In this state, the leaf is of a beautiful bright-green, and quite smooth; the browner and less quickly dried kinds are cheaper. Finally, the well-prepared Coca is wrapped up in large woollen cloths, and deposited for a time in the house, but the more this period is shortened, the better, as a few weeks of wet weather will spoil the colour even of what is thus secured from the immediate action of the atmosphere; for which reason the natives send their goods as quickly as possible from the vicinity of the damp woods. Immediately before despatching the Coca, it is pressed, by dint of treading, into sacks made of a coarse striped woollen stuff, manufactured for the purpose by the Indians of Conchucos; each of these, which is called a tercio, weighs, while in the forest, 80 lbs., but loses 10 *per cent.* in the course of a few weeks after its arrival at Huanuco, in consequence of the greater dryness of the air there. To prevent, in part, this heavy loss, the seller hastens to carry his Coca to the somewhat moister climate of the Andes. If well packed, the leaf is not apt to turn black, but inattention on the day of sending it away, or neglecting the precaution of securing the tercios from the night-dew,

while on their journey, by covering them with woollen wrappers, causes the Coca to heat, like bad hay, and to lose its flavour and colour.

The consumption of Coca is confined to Peru, where, however, it is nearly universal. All the people of the lower class are addicted to this usage, but the Negroes and inhabitants of the coast form an occasional exception. The Indians of the Sierra cannot live without it, and the usage exists even among the districts of the warm montaña. Such a superstitious feeling attaches to this practice, that the lowest classes at Huanuco thrust Coca into the mouth of the dying, and infer his future blessedness from the pleasure which the taste of this herb seems to impart to him. Below the Pongo of the Huallaga, and on the Marañon it is hardly known, so that it excites surprize to meet with the custom again at S. Paulo (Olivenza), where the shrub is called *Ypadú*. Owing, however, to the low situation and heat of the climate, its habit is very different from the Peruvian plant, and no less inferior in the quality of its foliage, which is further prepared and treated in such a manner as to deprive it even of its trifling properties. Wherever the sway and manners of the Incas have prevailed in Peru, there you find the Coca; but it disappears in those districts where the Aborigines were first subjugated by the Whites. For this cause, it is seen in Lamas, but not near Maynas, for its introduction into Brazil is of modern date, and it finds but a very limited number of votaries there. To the North, the Coca is known almost throughout Quito, Pasto, Popayan, and Cauca; but scarcely in Venezuela. Upper Peru, and Cuzco produce a good deal, which is consumed in the immediate neighbourhood, as neither Chili nor the States of Plata have adopted the custom. With the exception of the Brazils, the mode of using it is every where the same as in Colombia, Peru, and Bolivia. The *coquero* carries a small bag with him, in order to preserve the leaves entire, for he considers the broken ones to be worth but little, and the fragments and dust he throws away. A little calabash contains very finely pounded lime, but never in Northern Peru, the ashes of the plant, as is mentioned by Mr. V. Martius (Vol. III. p. 1169. 1180). A small metal needle runs through the stopper, this is moistened when used, turned about in the pounded lime, and drawn into the mouth by the ball of chewed leaves, taking care not to touch the lips with the caustic lime, which would excoriate the palate even of the practised *coquero*. But the teeth are infallibly destroyed by it, and the Peruvians, who are addicted to this custom, have all a horrible set of black and carious teeth. A workman of the common class, particularly if he be a real Indian, daily consumes from an ounce to an ounce and half of Coca; the more extravagant chewers double this allowance, and even sometimes raise it to four ounces. At Olivenza, where, as well as at Ega, a small Cocal was lately established, they dry the leaves rapidly by means of fire, and pound them, whilst hot, in a mortar, thus dissipating, it is said, their peculiar properties. The Peruvians, whose intimate acquaintance with this subject, no one, unhappily, can deny, are of opinion that too much heat deprives even the best Coca of the active principle, that a warm climate will spoil the Coca del Dia in ten months, while it continues good for a year and a half in the cold and dry districts of the Andes.

All old authors agree that the use of Coca may be traced to the highest antiquity, and that in the days of Manco Capac this leaf was so much prized as to form part of every sacrifice to the gods. It was then almost wholly confined to the higher classes, whence it gradually spread downwards, and became so prevalent in the time of the Conquistadores, that they, unable to detect any thing agreeable or efficacious in this leaf, ascribed its virtues to mere imagination (cosa de pura imaginacion), a belief that was combated, however, by Acosta, who justly says, that the increased ability to labour, which the Indians display after taking a handful of Coca, cannot be solely the result of mental delusion. The custom

of chewing Coca has certainly some affinity with the practice that is universal among the Indians, of continually masticating something, such as roots, small twigs, and herbs, and also of rubbing their teeth with pieces of bitter or astringent kinds of wood, which latter is also done by the white Peruvians and Chilians. The first proprietors of mines among the Conquistadores soon found, that without a supply of Coca no exertions could be expected from the Indians; and the Spaniards, who instantly set about cultivating it, were obliged to call in the aid of the Indians. These poor creatures, again compelled to quit the dry atmosphere of the Andes in order to tend the plantations of Coca in the warm and moist low lands, died in such numbers, that a royal ordinance was issued in 1567, prohibiting the culture of a plant "which is connected with the work of idolatry and sorcery, strengthening the wicked in their delusions, and asserted by every competent judge to possess no true virtues, but, on the contrary, to cause the deaths of innumerable Indians, while it ruins the health of the few who survive." Like too many well-meant public prohibitions, this was, however, soon evaded; though repeated in the strictest manner by the second Council of Lima, in 1569. The profits were too temptingly great, for in Potosi the monopoly produced to the Provincial Government a sum of not less than 500,000 p. d., from the consumption of 90—100,000 baskets, in the year 1583: and private individuals also drew immense revenues from the produce of their Cocals, in the provinces of Cuzco, La Paz, and La Plata. Thus the poor Indians were compelled, as before, to labour at an employment which was destructive to them, though orders to the contrary were often sent from Madrid, and it is with too much justice that the depopulation of Peru is ascribed, in a great measure, to this cause. After this period, the culture of the Coca greatly decreased, the diminishing number of its principal consumers, and the many Cocals that had been lately established, lowered the price of it. From this time up to the present day, the shrub has been only grown in private plantations, and all forced labour is entirely prohibited by the Republican Constitution.

The first expense of establishing a Cocal is trifling, compared with its returns, and as by good management and economy, the labour might be greatly diminished, and the produce as much increased, so there are few branches of agriculture which might be rendered equally profitable. It is not easy to gain a correct estimate of the expense and revenue of these plantations in a country where the land is so much diversified as in Peru, but the most experienced planters in the Quebrada de Chinchao have informed me that a Cocal, of which the original cost and current expenses amounted to 2,500 p. d. in the first twenty months, ought, at the end of ten months more, to bring a clear income of 1,700 p. d. Good management and economy will always enable the proprietor to clear off every incumbrance in six years at most, when the profits would regularly yield 45 per cent. on the capital. There is nothing to be feared from a sudden drop in the price or the failure of a crop, and the losses from rainy weather are but partial. The reason why so few planters of Coca become rich under such favourable circumstances, must be sought for in the adequate cause, of their negligence, and particularly immoral lives.

The value of Coca is estimated by cargoes or mule-loads of two tercios, containing, together, about 7 arrobas, or 175 Spanish pounds, and the price varies considerably, according to the distance to which it has to be conveyed. The planters generally contract with the merchants in town for their whole produce; but there is also a retail trade carried on with the country people, who give their dried potatoes and coarse woollen cloths for Coca, which they again sell at considerable profit. These poor but industrious Indians return home with gigantic loads on their backs, often weighing from 100 to 150 lbs., often over very bad roads, and sometimes, as the natives of Huaylilla, perform a journey of

seven days, thus encumbered, through the most frightful and perfectly uninhabited forests. Generally speaking, the decline of the mining business has diminished the demand for Coca, and many Cocals lie waste, because their owners, ruined by the war, no longer possess the means for carrying them on. The plantations in the Quebrada of Chinchao formerly yielded an annual harvest of 70,000 Spanish pounds, which, though fetching but a low price, enabled the inhabitants to support themselves, while the tax on Coca alone covered all the expenses of the Municipal Government of the place. Thus the Coca, pernicious as it is, seems to be a necessary evil, and its cultivation is so extensive as to become of statistical importance. Many of the woody districts would be uninhabitable without it. In the Quebrada of Chinchao there are one hundred and fifty plantations, which employ eighteen hundred men, thus affording work and support to such a number of persons as seldom can obtain a regular subsistence in so destitute a country as Peru. About two thousand persons, the families of the proprietors and their dependents, live upon the produce, and a thousand more may be added, who are little dealers and manufacturers of the woollen stuff, or muleteers. The fact, that by the cultivation of an insignificant shrub full employment may be afforded to almost five thousand persons in so small a space as this valley, proves what a large population might find room in Peru, and how numerous are the means of subsistence that are presented to the natives, if they would but labour. In Upper Peru (Bolivia) this branch of agriculture is of much greater importance, yielding annually about 400,000 baskets. The whole value of the Coca produced in Peru and Bolivia amounts to above two and a half millions a-year. The mode of culture differs but little in these countries, though the appearance of the shrub varies considerably, the under-side of the leaf in the Bolivian plant being of a yellowish colour. The assertion seems to me most surprising, that every ounce of the leaves yields half an ounce of gum, as I have been unable to detect this substance to such an amount, even in a very much larger quantity of leaves. Equally unfounded are the encomiums that have been passed on the Coca as stomachic and nutritive, qualities that can hardly be supposed to exist in a thin membranous leaf; and which repeated chemical analyses, made by me, while residing for many months in a Coca plantation, enabled me completely to disprove. I could find but a very small portion of vegetable mucilage in it, the saliva of the Coca-chewer is thin and watery, like that which flows from the chewing of Tobacco, and it betrays not the least trace of sugar to the palate. The older writers give but little information respecting the Coca—one only, who singularly enough has been hitherto overlooked, states, that "Coca has the effect of dispelling fatigue, and is masticated by the Indians in order to produce sleep, intoxication, and forgetfulness of all labour and care." What the Coca-root, briefly mentioned by Herrera as used for food is, I am not aware—perhaps the name, *raiz de Coca,* proves that he has confounded it with the *raiz de Yuca*, the *Sweet Manioc Root.*

NOTICE CONCERNING THE LATE MR. DRUMMOND'S COLLECTIONS, MADE CHIEFLY IN THE SOUTHERN & WESTERN PARTS OF THE UNITED STATES.

(*Continued from p.* 101.)

OLEINEÆ.

619. (1.) Forrestiera, *acuminata,* Poir. —N. Orl. (*n.* 211.)

GENTIANEÆ. *Juss.*

620. (1.) Gentiana *saponaria,* L.—St. Louis.—N. Orl. 1833.

621. (2.) Gentiana *ochroleuca,* Froel.—N. Orl. 1833. Jacksonville.—Notwithstanding all the attempts that have been made to discriminate between this and the preceding species, I am not satisfied that the two are really distinct: and one of my specimens, from St. Louis, partakes as much of the character of one as of the

other. The calycine segments vary extremely in length and breadth, as do the internal plicæ of the corolla in length and in the degrees of toothing. The colour of the flower of *G. ochroleuca* is very different in different individuals, frequently deeply tinged and streaked with purple, and *G. incarnata* of Sims, *Bot. Mag. t.* 1856, is surely only a pale yellowish-green flowered *var.* of the present. The New Orleans specimens appear to have white flowers; and this may, perhaps, be referred to the very obscure *G. alba*, Mühl. in Cat.

622. (3.) Gentiana *Catesbæi*, Walt. — *Ell. Carol. v.* 1. *p.* 339.—St. Louis.—This, again, as is acknowledged by all authors, comes very near the two preceding species. Its leaves are narrower, and the segments of the corolla are less incurved. This, or some var. of *G. saponaria*, is probably what Michaux took for the Linnæan *G. Pneumonanthe*, and he thence erroneously introduced that plant into the American Flora, in which he has been followed by all subsequent authors. "Between Canada and Hudson's Bay," is the station given by Michaux: but in the rich collection I possess from that country, I have never seen anything that could be referred to our European *G. Pneumonanthe*. Pursh extends the limits of it "from Canada to Pennsylvania." My accurate and valued friend, Dr. Torrey, observes that the N. American *G. Pneumonanthe*, which has been made a species by Roemer and Schultes, "*G. Pseudo-Pneumonanthe*," (though these authors appear never to have seen it,) "differs in no respect from numerous European species in my Herbarium. It was obligingly communicated to me by Dr. Bigelow." Dr. Bigelow's station is, "Swamps near Portland, Maine, Massachusets." I possess a specimen from the same spot, given me by Dr. Boott (the friend of Dr. Bigelow, and the companion of so many of his excursions), which had been first of all labelled, "*G. saponaria*," (but which I am rather inclined to refer to *G. Catesbæi*:) then, after Dr. Boott had compared it with Michaux's Herbarium at Paris, it was named, "*G. Pneumonanthe*, Mich." The true *G. Pneumonanthe* of Linn. must therefore, I think, be erased from the American Flora.

623. (4.) Gentiana *quinqueflora*, Froel. — St. Louis.—This is probably its most southern limit in the United States. Dr. Darlington has sent me specimens, "e montibus altis, Peaks of Otter, Virginia," and it appears to be frequent in the North.

624. (1.) Sabbatia *gracilis*, Mich. (sub *Chironiam*), not of *Ell.* nor *Nutt.*—Covington.—Whole plant exceeding slender: lower leaves linear, upper ones almost setaceous.—I have the same plant under the same name from Dr. Short, gathered in Georgia, by Dr. Boykin. I possess it also, from Augusta, by favour of Dr. Wray. The *Sabbatia* (*Chironia*, Mx.) *paniculata*, is probably only a more erect and shorter growing state of this plant.

625. (2.) Sabbatia *angularis*, L. (sub *Chironiam*)—Covington.—St. Louis.

626. (3.) Sabbatia *calycosa*, Mich. (sub *Chironiam*).—N. Orl. (*n.* 222.) and 1833.

627. (4.) Sabbatia *campestris*; erecta, foliis ovatis amplexicaulibus, pedunculis elongatis subfastigiatis, calycibus ciliatis, laciniis linearibus corollam 5-partitam superantibus. *Nutt. in Fl. of Arkansa Territ. p.* 197. — N. Orl. (*n.* 223.) — A most distinct and well-marked species, first discovered by Mr. Nuttall, in open prairies of the Arkansa and Red Rivers, whence I have received specimens from that author.

628. (5.) Sabbatia *brachiata*, Ell. — N. Orl. (*n.* 224.)—Flowers rose-colour, becoming nearly white in drying. Our specimens exactly agree with original ones of Mr. Elliott, in my Herbarium. I possess, also, copious specimens from N. Orleans, gathered by M. Tainturier. Its nearest affinity is doubtless, *S. corymbosa*, of which, however, I possess no specimens, except from New Jersey, N. Carolina, and Georgia.

629. (6.) Sabbatia *macrophylla*; elata, caule tereti, foliis late ovatis acutissimis 5-nerviis subtus glaucis, panicula amplissima corymbosa, floribus parvis (albis), calycis dentibus minutissimis tubo corollæ profunde 5-partitæ brevioribus. —Covington. — The largest of all the species (three to four feet high); at the same time having the smallest flowers and the most minute calycine teeth. Leaves two inches long, and full an inch broad. Panicle exceedingly large.

630. (7.) Sabbatia *gentianoides*, Ell. — Covington.

631. (8.) Sabbatia *chloroides*, Mich. (sub *Chironiam.*)—Covington.

632. (1.) Centaurella *verna*, Mich. — N. Orl. (*n.* 221.)

633. (2.) Centaurella *paniculata*, Mich. —Covington.

634. (1.) Ophiorrhiza *Mitreola*, L.—Covington.

635. (2.) Ophiorrhiza *lanceolata*, Ell.—Covington.
636. (1.) Spigelia *Marylandica*, L.—N. Orl. (*n*. 220.)
637. (1.) Villarsia *trachysperma*, Ell.—N. Orl. (*n*. 225.)
638. (2.) Villarsia *lacunosa*, Vent.—*V. cordata*, Ell.—Covington.—Leaves much smaller, and far less deeply pitted than in the preceding species.

BIGNONIACEÆ. *Br.*

639. (1.) Bignonia *capreolata*, Mich.—N. Orl. (*n*. 226.)
640. (1.) Tecoma *Stans*, Juss.—St. Louis.

PEDALINEÆ. *Br.*

641. (1.) Martynia *proboscidea*, L.—St. Louis.

HYDROLEACEÆ. *Br.*

642. (1.) Hydrolea *spinosa*, L.—Covington.
643. (2.) Hydrolea *Caroliniana*, Mich.—*H. quadrivalvis*, Walt. and other authors, but the capsule is *not* four-valved.—N. Orl. 1833.

POLEMONIACEÆ. *Juss.*

644. (1.) Polemonium *reptans*, L.—Alleghanies.
645. (1.) Phlox *acuminata*, Ph.—*Bot. Mag. t.* 1880.—St. Louis.—Is this really distinct from the Linnæan *P. paniculata?*
646. (2.) Phlox *pilosa*, L.—St. Louis.
647. (3.) Phlox *aristata*, Mich.—N. Orl. (*n*. 227.)—Probably, as Mr. Nuttall suggests, only a glabrous state of *P. pilosa*.
648. (4.) Phlox *divaricata*, L.—Alleghanies.
649. (5.) Phlox *reptans*, Mich.—Alleghanies.
650. (6.) Phlox *subulata*, L.—Philadelphia. Alleghanies.—Surely this species and *P. setacea* are not specifically distinct: I possess various intermediate states, especially from my valued correspondent, Dr. Short, of Kentucky. In dry and poor soils, the stems are more straggling, the leaves shorter and more fasciculated, and the whole plant has a more rigid aspect.

HYDROPHYLLEÆ. *Br.*

651. (1.) Hydrophyllum *appendiculatum*, Mx.—Alleghanies.
652. (2.) Hydrophyllum *Virginicum*, L.—Wheeling. Alleghanies.
653. (3.) Hydrophyllum *Canadense*, L.—Alleghanies.
654. (4.) Hydrophyllum *macrophyllum;* foliis pinnatifidis grosse-inciso dentatis, laciniis rhomboideo-ovalibus supremis confluentibus, pedunculo longissimo calycibusque hirsutis, cyma congesta laciniis calycinis brevioribus. *Nutt. in Journ. Acad. Nat. Sc. Philad. v.* 7. *p.* 111.—Alleghanies.—This fine and very distinct species was first discovered by Dr. Short, from whom I possess specimens exactly corresponding with those of Mr. Drummond.
655. (1.) Ellisia *microcalyx;* glabriuscula, decumbens, foliis lyrato-pinnatifidis longe petiolatis, laciniis paucis (3—5) lateralibus obliquis inciso-dentatis intermedio trifido obtuso, floribus solitariis minutis. *Nutt. in Flor. of Ark. Territ. p.* 191.—N. Orl. (*n*. 233.)—This I have formerly received from Mr. Parker, gathered on the Mississippi: and from the same gentleman, I possess the *E. ranunculacea*, also of *Nutt.*, described in the same work. Both these Mr. Bentham refers to *Nemophila*.
656. (1.) Eutoca *parviflora*, Br. (*Phacelia*, Ph.)—Alleghanies.

BORAGINEÆ. *Juss.*

657. (1.) Tiaridium *Indicum*, Lehm.—*Heliotropium Indicum*, L.—N. Orl. (*n*. 229, bis.)—St. Louis.
658. (1.) Myosotis *stricta*, L.—*M. verna*, *Nutt.*—*M. arvensis*, Tor.—N. Orl. (*n*. 232.) Pennsylvania.
659. (1.) Echinospermum *Virginicum*, Lehm.—Alleghanies.
660. (1.) Onosmodium *hispidum*, Mich.—N. Orl. (*n*. 231.)
661. (2.) Onosmodium *molle*, Mich.—St. Louis.
662. (3.) Onosmodium *scabrum*, Roem. et Sch.—N. Orl. 1833.
663. (1.) Pulmonaria *Virginica*, L.—Alleghanies. St. Louis.
664. (1.) Cynoglossum *Virginicum*, L.—N. Orl. (*n*. 230.) Alleghanies.

CONVOLVULACEÆ. *Juss.*

665. (1.) Convolvulus *tenellus*, L.—(*C. trichosanthes*, Mich.—*C. Sherardi*, Ph., according to Nuttall).—*var.* foliis latioribus.—N. Orl. (*n*. 228.) Covington.—The *C. aquaticus*, of Walt. and Elliott, does not differ from this, except in being very downy.

666. (2.) Convolvulus *Sepium*, L.—Covington.
667. (3.) Convolvulus *Stans*, Mx.—*C. spithamæus*, L.—Alleghanies.
668. (4.) Convolvulus *sagittifolius*, Mx. —N. Orl. 1833.
669. (5.) Convolvulus *purpureus?* L.—(*Ipomæa*, Ph.) Covington.
670. (6.) Convolvulus *tamnifolius*, Mey. (*Ipomæa*, Ph.)—Covington.
671. (7.) Convolvulus *hederaceus*, Miller (not *Linn.*, *fide Chois. in Herb. nostr.*) —Jacksonville.
672. (1.) Ipomæa *coccinea*, L.—N. Orl. 1833.
673. (2.) Ipomæa *trichocarpa*, Ell.—N. Orl. (*n.* 228 bis.)—Jacksonville, (bad specimens).
674. (1.) Capraria *multifida*, Mx.—St. Louis.
675. (1.) Dichondra *Caroliniana*, Mich. —N. Orl. (*n.* 229.)
676. (1.) Cuscuta *Americana*, L.—St. Louis.—Some of the specimens of this plant seem to have all the flowers abortive and turned into scales, which are *excessively* crowded, and form a dense wreath, of a pale straw colour, around the branch of some shrub.
677. (2.) Cuscuta *coronata*, Beyrich, *in Herb. Americ.*—N. Orl. 1833, on the stems of *Laurus Caroliniana*.

SOLANEÆ. *Juss.*

678. (1.) Solanum *Carolinense*, L.—Ohio.
679. (2.) Solanum *nigrum*, L.—N. Orl. 1833.—St. Louis.
680. (1.) Physalis *pubescens*, L.—Ohio. Alleghanies. St. Louis. N. Orl. 1833.
681. (2.) Physalis *obscura*, Mx.—α. *angulata*, Ph.—St. Louis. N. Orl. 1833.—β. *viscido-pubescens*, Ph.—Jacksonville.
682. (3.) Physalis *Philadelphica*.—Alleghanies.—The characters of these supposed species of *Physalis* are very obscure and unsatisfactory.
683. (1.) Lycium *Carolinianum*, Walt. —N. Orl. (*n.* 234.)

OROBANCHEÆ. *Juss.*

684. (1.) Orobanche *uniflora*, L.—*O. biflora*, Nutt.—Pennsylvania.
685. (2.) Orobanche *Virginiana*, L.—*Epifagus Americana*, Nutt.—Jacksonville.

SCROPHULARINÆ. *Juss.*

[N.B. In the arrangement of the Genera of this Order, I have followed that of Mr. Bentham, in the Botanical Register, under folio 1770.]

VERBASCEÆ. *Nees.*

686. (1.) Verbascum *Thapsus*, L.—Covington.
687. (1.) Scrophularia *lanceolata*, Ph.—St. Louis. Alleghanies.
688. (1.) Linaria *Canadensis*, Spr.—N. Orl. (*n.* 243.) Pennsylvania.
689. (1.) Pentstemon *pubescens*, Ait.—Alleghanies. Pennsylvania.
690. (2.) Pentstemon *lævigatum*, Ait.—N. Orl. (*n.* 235.)—Are this and *pubescens* really distinct species?
691. (1.) Chelone *glabra*, L.—*var.* β. *lanceolata*.—St. Louis.
692. (1.) Mimulus *ringens*, L. Ait.—N. Orl. 1833. Jacksonville.
693. (1.) Herpestis *cuneifolia*, Ph.—N. Orl. (*n.* 240.) Covington.
694. (2.) Herpestis *amplexicaulis*, Ph.—Covington.
695. (3.) Herpestis *rotundifolia*, Ph.—St. Louis.
696. (1.) Matourea *nigrescens*, Benth.—(*Gratiola acuminata*, Ell.! non Pursh.) —Covington.
697. (1.) Gratiola *pilosa*, Mx.—Covington.
698. (2.) Gratiola *sphærocarpa*, Ell.—N. Orl. (*n.* 238.) and 1833.—This has been found by Dr. Short, in swamps of the Lexington river, Kentucky.
699. (3.) Gratiola *Virginica*, L.—Alleghanies.
700. (1.) Lindernia *dilatata*, Mühl.—N. Orl. (*n.* 239.)—Covington. St. Louis. Ohio.—Dried specimens of this are often confounded with *Gratiola Virginica*, but the narrow-oblong germen or capsule will readily distinguish it.
701. (2.) Lindernia *attenuata*, Mühl. Ell. —N. Orl. 1833.

OBS. The *Lindernia refracta*, Ell. and of Beyrich's plant from Georgia, is *L. monticola*, Ell. and *L. filiformis* of Baldwin, MSS.

702. (1.) Micranthemum *orbiculatum*, Mich.—Covington.
703. (1.) Buchnera *Americana*, L.—N. Orl. (*n.* 241.)—St. Louis.
704. (1.) Sutera *multifida*, Benth. (*Capraria multif.*, L.—*Leucospora multifida*, Nutt.)—St. Louis.
705. (1.) Veronica *Virginica*, L.—(*Leptandra*, *Nutt.*)—St. Louis.
706. (2.) Veronica *agrestis*, L.—N. Orl. (*n.* 237.).
707. (3.) Veronica *peregrina*, L.—N. Orl. (*n.* 236.)
708. (1.) Polypremum *procumbens*, L. —Covington.—Although my valued friend, Mr. Bentham, has omitted this Genus in his revision of the *Scrophula-*

rinæ, above quoted, I am yet of opinion that it is correctly referred to this Order by Chamisso and Schlechtendal (*v. Linnea, v.* 5. *p.* 105.), and that its proper place is in Mr. Bentham's tenth Tribe, "VERONICEÆ, 2 Div. *Stamina* 4. Coralla 4-*fida*." There is indeed a union of the base of the germen with that of the corolla and calyx, but it is of a very small portion: the whole of the seed-bearing part is free: and the general structure of this capsule is similar to that of the greater number of *Veronicæ*: oval, compressed, and furrowed down the middle, where is situated the dissepiment of the two cells. Dehiscence on each side in the centre of the cell, by a suture rather than by valves, the apex always continuing united with the persistent style. The corolla is infundibuliform, bearded at the mouth, as in *Scoparia*, a genus closely allied to the present. Jussieu and De Candolle have referred the genus to *Rubiaceæ*; Richard to *Caryophylleæ*.

MACRANTHERA. *Le Conte. Benth.*

CONRADIA. *Nutt. non Mart.*

Cal. 5-fidus, foliaceus. *Cor.* monopetala, cylindracea, subæqualis, apice 5-dentato, dentibus reflexis. *Stamina* 4, vix declinata, subæqualia, longe exserta. *Stylus* longissimus. *Stigma* minutum. *Capsula* brevi-ovata, 2-locularis, polysperma.—Herba *magna perennis, foliis oppositis sublyratis.* Flores *axillares, racemosi, flavi.* Habitus *Gerardiæ* sed flores vix inæquales. *Nutt. in Journ. Ac. N. Sc. Phil. v.* 7. *p.* 8.

709. (1.) M. *fuchsioides*. *Nutt. l. c.* (sub *Conradiam*)—var. laciniis calycinis integerrimis.—Covington.—This is a very fine plant, but certainly closely allied to the larger *Gerardiæ*. The peduncles stand out horizontally, and curve upwards at the extremity, so that the large handsome flowers are erect.

710. (1.) Gerardia *fasciculata*, Ell.—Jacksonville.—Some of the specimens agree precisely with Elliott's description, others come nearer to *G. purpurea*, of which it may be a mere variety, differing chiefly in its narrower leaves, often fasciculated, rigid habit, and remarkably scabrous stem and leaves.

711. (2.) Gerardia *filifolia*, Nutt.?—Jacksonville. Louisiana.—This differs from Nuttall's description in the roughness of the leaves, but that author had evidently only a single, imperfect specimen. It is intermediate between the Mexican *G. peduncularis*, Benth., and the *G. tenuifolia*, γ., distinguished from the former by the slender stems and filiform leaves, often, but not always fascicled, from the latter by the large flowers, long peduncles, &c.

712. (3.) Gerardia *tenuifolia*, Vahl.—α. *humilis*, læviuscula, foliis maximis vix ultra pollicaribus latiusculis, corolla 5—6-lin. longa.—β. *macrophylla*, scabrior, foliis maximis 2—3-pollicaribus latiusculis, corolla 7—8-lin. longa. St. Louis, Jacksonville.—γ. *leptophylla*, scabriuscula, elata, foliis filiformibus maximis vix pollicaribus, corolla 6—7-lin. longa. Jacksonville. Louisiana.

713. (4.) Gerardia *setacea*, Walt., Pursh.—St. Louis.—β. *parvifolia*, foliis distantibus 3—6-lin. longis, floribus racemosis. Jacksonville.—This variety has some resemblance to *G. aphylla*, but the leaves are never reduced to mere squamæ. The capsule in both varieties is longer in proportion to the calyx than in either *G. tenuifolia* or *G. aphylla*, between which species this one forms the connecting link. It does not dry so black as any others of the genus.

714. (5.) Gerardia *aphylla*, Nutt.—β. *filicaulis*, ramis gracillimis paucifloris, floribus parvis, Jacksonville.—γ. *grandiflora*, ramis rigidis, floribus racemosis majusculis, Jacksonville.—In the variety β. the flowers are rather smaller, in γ. rather larger than in the common varieties of *G. tenuifolia*. The *G. aphylla* appears to be a variable plant, but readily known by the greater number of the leaves being reduced to obtuse or mucronate squamæ, scarcely a line long. Very rarely the lower leaves attain the length of four or five lines, in which case they are remarkably rigid and sharp.

715. (6.) Gerardia *auriculata*, Mx.—St. Louis.

716. (7.) Gerardia *flava*, L.—St. Louis.

717. (8.) Gerardia *quercifolia*, Ph.—Covington. St. Louis.

718. (1.) Seymeria *tenuifolia*, Ph.—Jacksonville.—N. Orl. 1833.

719. (2.) Seymeria *pectinata*, Ph.—N. Orl. 1833.

720. (1.) Castilleja (*Euchroma*, Nutt., *Bartsia*, L.) *coccinea*, Spreng.—Alleghanies. Pennsylvania.

721. (1.) Pedicularis *lanceolata*, Mx.—St. Louis.

722. (2.) Pedicularis *Canadensis*, L.—N. Orl. (*n.* 242.) Alleghanies. Pennsylvania.

LABIATÆ. *Juss.*

723. (1.) Hyptis *radiata*, Willd.—Covington.—I have the same plant also from Dr. Wray, gathered at Augusta.
724. (1.) Isanthus *cæruleus*, Mich.—St. Louis.
725. (1.) Mentha *piperita*, L.—Covington.
726. (2.) Mentha *viridis*, L.—*M. tenuis*, Mich. — Covington. — This, the *M. tenuis*, Mx., which is also found by Dr. Short, at Kentucky, is correctly referred by Mr. Bentham to the European *M. viridis*.
727. (3.) Mentha *Canadensis*, L.—St. Louis.—The more glabrous var. β. of Mr. Bentham is the *M. glabrata*, Mich.
728. (1.) Lycopus *Virginicus*, L.—St. Louis. Jacksonville.
729. (2.) Lycopus *sinuatus*, Ell.—*L. Europæus*, Mich.—Ohio.—The *L. Europæus* of Mich. and Pursh is the *L. sinuatus* of Elliott and Bentham, and this latter author refers to it also the *L. exaltatus*, Ell. (not *Linn.*), *L. vulgaris*, and *L. angustifolius*.
730. (1.) Salvia *azurea*, Lam.—Jacksonville (where Mr. Drummond also found it with white flowers). Covington.
731. (2.) Salvia *lyrata*, L.—N. Orl. (*n.* 244.)
732. (3.) Salvia *obovata*, Ell.—N. Orl. (*n.* 245.)

Obs. The rare *Salvia urticæfolia* of Linn. and Benth. *Lab. p.* 258, I possess from North Carolina and Virginia, where it was gathered by Mr. Greene.

733. (1.) Monarda *fistulosa*, L. (including, according to Mr. Bentham, *M. allophylla*, Ph., *M. Clinopodia*, L., *M. purpurea*, Ph. &c.)—N. Orl. 1833.—β. *mollis*. *M. mollis*, *L.*—St. Louis.
734. (2.) Monarda *Bradburiana*, Beck. Benth.—*M. fistulosa*, Hook. *Bot. Mag. t.* 3310. (excl. syn.)—N. Orl.—Cult. in the Glasgow Botanic Garden, from seeds sent by Mr. Drummond from N. Orleans. To me it appears to be a nearly sessile-leaved var. of *M. fistulosa*; and I find no specimens exactly corresponding with it in the Herbarium.
735. (3.) Monarda *punctata*, L.—Jacksonville. Covington.
736. (1.) Blephilia *ciliata*, Raf.—*Monarda ciliata*, L. (not *Mich.*)—Alleghanies.
737. (2.) Blephilia *hirsuta*, Benth. *Monarda hirsuta*, Ph.—St. Louis.
738. (1.) Pycnanthemum *incanum*, Mich. *var.* capitulis paucifloris, bracteis dentibusque calycinis magis obtusis, foliis minoribus.—Covington.
739. (2.) Pycnanthemum *hyssopifolium*, Benth. *Lab. p.* 329.—N. Orl. 1833.
740. (3.) Pycnanthemum *muticum*, Pers. var. *pilosum*. *P. pilosum*, Nutt.—St. Louis.
741. (4.) Pycnanthemum *lanceolatum*, Ph.—β. *angustifolium*, Benth.—St. Louis.
742. (5.) Pycnanthemum *linifolium*, Ph. —St. Louis.
743. (1.) Collinsonia *Canadensis*, L.—Jacksonville.
744. (2.) Collinsonia *scabriuscula*. Ait. —Jacksonville.
745. (1.) Cunila *hispida*, Ph. Benth.—*Hedeoma hirta*, Nutt.—St. Louis.
746. (1.) Melissa *Caroliniana*, Benth.—*Thymus Carolinianus*, Mich.—*T. grandiflorus*, Sims, *Bot. Mag. t.* 997.—*Calamintha grandiflora*, Ph.—Covington.
747. (1.) Prunella *vulgaris*, L.—*P. Pennsylvanica*, Willd.—St. Louis.—These specimens have very acute leaves: I possess others from Lexington and New York, which differ in no respect from our European plant.
748. (1.) Scutellaria *versicolor*, Nutt.—*S. ovalifolia*, Mühl. *Cat.*—N. Orl. (*n.* 250.)—Ohio.
749. (2.) Scutellaria *canescens*, Nutt.—St. Louis.
750. (3.) Scutellaria *pilosa*, Mich.—N. Orl. (*n.* 249.)
751. (4.) Scutellaria *integrifolia*, L.—N. Orl. (*n.* 248.)
752. (5.) Scutellaria *angustifolia*, Ph. Benth.—An imperfect specimen found by Mr. Drummond, at Covington, as mentioned by Mr. Bentham, *Lab. p.* 436.
753. (6.) Scutellaria *parvula*, Mich.—*S. ambigua*, Nutt.—Alleghanies.
754. (7.) Scutellaria *nervosa*, Ph.—Ohio.
755. (8.) Scutellaria *lateriflora*, L.—St. Louis.
756. (1.) Lophanthus *nepetoides*, Benth. —(*Hyssopus*,) *L.*—St. Louis.
757. (1.) Cedronella *cordata*, Benth.—*Nutt.*—Alleghanies.
758. (1.) Physostegia *Virginica*, Benth. —St. Louis.—N. Orl. (*n.* 257.)
759. (1.) Lamium *amplexicaule*, L.—N. Orl. (*n.* 246.)
760. (1.) Stachys *aspera*, Mich.—*S. hispida*, Ph.—N. Orl. (*n.* 247.)
761. (2.) Stachys *hyssopifolia*, Mich.—St. Louis.
762. (1.) Trichostemma *lineare*, Mühl.—Jacksonville.
763. (2.) Trichostemma *dichotomum*, L. —Jacksonville.
764. (1.) Teucrium *Canadense*, L.—St. Louis.

VERBENACEÆ. *Juss.*

765. (1.) Verbena *Aubletia*, Juss.—Jacksonville. St. Louis. N. Orl. 1833.

766. (2.) Verbena *officinalis*, L.—N. Orl. (*n.* 252.)—β. *spuria*, minor.—N. Orl. 1833.—The V. *spuria*, Willd., which I possess from Pennsylvania and New Jersey, I agree with Mr. Nuttall in considering a mere var. of *officinalis*.

767. (3.) Verbena *bracteosa*, Mx.—St. Louis.—N. Orl. (*n.* 253 *ter.*)

768. (4.) Verbena *hastata*, L.—St. Louis.—N. Orl. 1833. Ohio.—From this the *V. paniculata* is probably not distinct, and the *V. urticæfolia* seems too nearly allied.

769. (5.) Verbena *integrifolia*, Mich.—*V. rugosa*, Willd.—St. Louis.

770. (6.) Verbena *Caroliniana*, L.—N. Orl. (*n.* 253.)

771. (7.) Verbena *stricta*, Vent. *Bot. Mag. p.* 1976.—*V. alopecuroides*, Hort.—St. Louis.

772. (8.) Verbena *strigosa*, (n. sp.); strigoso-hirsuta, erecta, stricta, foliis sessilibus rugosis lato-lanceolatis profunde pinnatifidis incisis segmentis valde acutis nervis subtus prominentibus, spicis simplicibus paniculatisve elongatis, floribus laxiusculis.—N. Orl. (*n.* 253 *bis*) and 1833.—Of this I have received copious specimens, both from Mr. Drummond and from Tainturier, so that it must be a very common plant: yet it does not appear to have been taken up by any author, nor have specimens been transmitted to me through any other source than those now mentioned. Its nearest affinity is, perhaps, with *V. stricta*, but the leaves are strongly pinnatifid, harsh, with the principal veins more prominent on the under-side, yet not exhibiting such a strongly-reticulated appearance; the spikes are longer, more lax; the flowers much smaller, more distant, and not pressed to the rachis. It is a strong-growing plant, two to three feet high, quite hispid with appressed hairs or bristles.

773. (1.) Callicarpa *Americana*, L.—N. Orl. (*n.* 254 *bis*) and 1833.

774. (1.) Zapania *nodiflora*, Lam.—N. Orl. (*n.* 254.)—St. Louis.

775. (2.) Zapania *lanceolata*, Ph.—St. Louis.

776. (1.) Phryma *leptostachya*, L.—St. Louis.

ACANTHACEÆ. *Juss.*

777. (1.) Justicia *pedunculata*, Mx.—Alleghanies.

778. (2.) Justicia *humilis*, Mx.—N. Orl. (*n.* 255.)

779. (1.) Ruellia *justiciæflora*, n. sp.; caule erecto subsimplici piloso, foliis lanceolatis integerrimis sessilibus basi connatis ciliatis, floribus axillaribus congestis sessilibus, corolla subcylindracea bilabiata, capsulis lineari-oblongis acutissimis.—N. Orl. (*n.* 256.) and 1833.—This appears to be an abundant plant, yet certainly not described by any author. It would seem to be a native of marshy ground. The leaves are exactly lanceolate-glabrous, except on the margin and on the midrib beneath. *Flowers* small, scarcely twice so long as the calyx, truly two-lipped, the lips erect, upper one entire, lower one trifid. *Stamens* four, didynamous, included. *Anthers* two-celled. *Capsule* many-seeded, seminiferous to the base. This I have also received from M. Tainturier, gathered in the same country.

780. (2.) Ruellia *strepens*, Ohio.—St. Louis.—N. Orl. (*n.* 257.) β. *obtusifolia*, Covington.—This has the leaves similar to those of *R. oblongifolia*, but they are in more remote pairs, the whole plant is larger, and the tube of the corolla longer. The *R. ciliosa*, Ph. of Beyrich's Georgian plants, seems to me to be a small ciliated variety of *R. strepens*. The same I have received without a name, from Dr. Short, gathered on the Kentucky river.

781. (3.) Ruellia *longiflora*, L.—N. Orl. (*n.* 258 and 259.)—Covington.—Tube of the corolla twice or thrice as long as in *R. strepens*.

LENTIBULARIEÆ. *Rich.*

782. (1.) Utricularia *vulgaris*, L.—N. Orl. (*n.* 263.)

783. (2.) Utricularia *inflata*, Walt.—N. Orl. (*n.* 261.)

784. (3.) Utricularia *gibba*, L.—N. Orl. (*n.* 262.)

785. (4.) Utricularia *setacea*, Mich.—N. Orl. (*n.* 260.)

786. (5.) Utricularia *personata*, Le Conte.—Covington.

787. (1.) Pinguicula *lutea*, Walt.—N. Orl. (*n.* 264.)

PRIMULACEÆ. *Vent.*

788. (1.) Hottonia *inflata*, Ell.—N. Orl. (*n.* 266.)

789. (1.) Anagallis *arvensis*, L.—N. Orl. (*n.* 265.)

790. (1.) Centunculus *lanceolatus*, Mich.—N. Orl. 1833.

791. (1.) Lysimachia *hybrida*, Mx.—St. Louis.

792. (2.) Lysimachia *radicans*, n. sp.; humifusa elongata laxa, ramis apice radicantibus, foliis oppositis lanceolato-acuminatis summis subovatis omnibus petiolatis, petiolis gracilibus basi ciliatis, pedicellis solitariis umbellatisque axillaribus, corollis calyce duplo brevioribus.—Jacksonville.—The specimens of this singular plant are few and badly dried, but suffice to show that though in some respects allied to the preceding species, it is abundantly distinct. The stems and branches are long and straggling, rooting at the extremities, the leaves of all of them upon rather long and slender stalks, ovate (not attenuated) at the base. The corolla is not half the length of the calyx, and there is a five-lobed, downy, annular disk, on which the filaments are inserted alternately with the lobes. Fruit and seeds exactly as in *L. hybrida*.

793. (1.) Micranthemum *orbiculatum*, Ell.—Covington.

794. (1.) Samolus *Valerandi*, L.—N. Orl. (*n.* 268.)

(To be continued.)

HISTORICAL SKETCH OF THE PROGRESS OF BOTANY IN RUSSIA, FROM THE TIME OF PETER THE GREAT TO THE PRESENT DAY; AND ON THE PART WHICH THE ACADEMY HAS BORNE IN THE ADVANCEMENT OF THIS SCIENCE.

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(Translated from the Recueil des Actes de Petersbourg, de 1834.)

The degree of perfection which the Natural Sciences have attained in our times, presents a most agreeable subject of contemplation to those who delight in tracing the wonders of nature, and in observing the progressive course of human knowledge. The march of civilization, the improvement in arts and sciences, and by means of these, the extension of commerce and navigation, have, as it were, brought close together the most distant countries; and Naturalists of all nations have since been seen vying with one another in their endeavours to promote the cause of science in all parts of the globe, and braving unnumbered dangers in the prosecution of this object. Hence, immense treasures of various kinds have poured into our collections, and these, when studied, and compared by men of observation, have conduced to the most important discoveries. It is well known how much Zoology, Geology, and Mineralogy have thus been the gainers.

Botany has had its share in these valuable acquisitions, and perhaps the fairest and most important of them have fallen to its lot.

If we consider that when Linnæus, eighty years ago, published, for the first time, his *Species Plantarum*, scarcely seven thousand vegetables were known, and that this great botanist estimated the total number of plants on the surface of the earth, as not amounting to more than ten thousand species—we are struck with astonishment at seeing that their number now exceeds sixty thousand. Thus the herbarium of Linnæus, the richest then known, contained but seven thousand plants, a number which would now form a very poor collection, many of the larger ones consisting of from thirty to forty thousand species, and even more. This prodigious augmentation of new vegetables has exercised an essential influence on the progress of science. A multitude of novel and extraordinary forms, with an infinite variety in the structure of their parts, have been observed, which have necessarily led to a deeper insight into their structure, as well as to a more exact acquaintance with those natural affinities, by which plants are united to one another. The *Linnæan System* has thus been replaced by a philosophical classification, called the *Natural Arrangement*.

A more intimate acquaintance with vegetable organization has thrown great light on the mysteries of the vegetable economy, while the ingenious improvements that have been effected in the construction of microscopes, promise gradually to dissipate the obscurity which still envelops this difficult but important branch of the science, and to afford much information on the sub-

ject of Vegetable Physiology. The study of the Cryptogamic plants, which had been almost wholly neglected by the older Botanists, now opens, as it were, a new world, by displaying the greatest beauty of structure in the most minute and apparently insignificant objects. M. de Humboldt was the first to treat on the Geography of Botany, which he has done with the eminent talent which distinguishes all his works; he has taken a comprehensive view of vegetation, and by his novel and highly philosophic theory, has made a most interesting and important addition to science.

But it is not my intention to attempt an account of the progress which Botany has made since the days of Linnæus, as this subject would infinitely exceed the bounds to which I am limited; my object is rather to take a summary view of the labours of our own Russian Botanists, and of the aid which they have lent towards the advancement of this science; and though I can only give a hasty sketch, I trust that it will not be found destitute of interest.

The first beginnings of botanical knowledge in Russia seem to bear date in the reign of Peter the Great; it was this great monarch who introduced the Arts and Sciences into his empire, and was the patron of Natural History. Justly considering Botany an essential part of the medical science, he founded, in 1706, the Apothecaries' Garden, at Moscow, and, eight years later, that which now exists in St. Petersburg. He seems to have been himself fond of Botany, and to have frequently employed his hours of relaxation in collecting plants, which he preserved with the utmost care; a small, but highly valuable collection of specimens, gathered and prepared by the hands of this great monarch, still exists in the Museum of the Naturalists' Society, at Moscow. The visit which Peter the Great paid to the Academy of Science at Paris, and the rich collections of Natural History and different curiosities which he had seen there, as well as the several Cabinets in Holland, had made a strong impression on his mind, and inspired him with the desire of exploring the natural riches of his own vast empire, and creating a similar Academy in its capital. Dr. Schober was the first whom he despatched, in 1717, upon a scientific expedition; his errand was to visit the shores of the Térek for the purpose of examining its thermal sources, and it is to this journey that we owe our earliest acquaintance with the vegetation of this river and of the Wolga. The genus *Nitraria*, then established by Schober, commemorates, to the present day, this commencement in the path of science. Soon after this period, the appointment of Dr. Messerschmidt, whom the learned Breynius recommended to Peter the Great, as an active and experienced naturalist, opened to the scientific world the vast treasures of that hitherto unknown region, the kingdom of Siberia. His journey, which commenced in 1719, was continued till the year 1727, and extended over the greater part of Siberia, where he amassed, unaided, very rich collections of plants and other natural curiosities. The value of these was greatly enhanced by the manuscript observations which accompanied them, but the publication of these was prevented by unfortunate circumstances. Still the discoveries of Messerschmidt have not been entirely lost to science, as Ammann and Gmelin have published all the most interesting among them.

The first Russian publication on Botany appeared in the year 1726; that of Buxbaum, accompanied by three hundred plates in outline, representing a large proportion of new plants. This author, having accompanied Count Alexander Roumanzoff to Constantinople, paid much attention to the Flora of this capital, and thence, following the steps of the celebrated Tournefort, he visited the shores of the Black Sea, Asia Minor, and Armenia, returning to Russia by way of Derbent and Astrakan. A large part of these provinces now belongs to Russia, and it is to Buxbaum, after Tournefort, that we owe our first acquaintance with the vegetable treasures of these countries. The lower classes of plants, hitherto so universally neglected, and principally the Mosses and Fungi,

attracted the attention of Buxbaum, whose name is immortalized by having been conferred, by the pen of Linnæus, on a moss, of most striking and peculiar structure, which he was the first to detect and examine. The same year witnessed the appearance of the first volume of the Academy's Memoirs; this Institution was newly established, and Buxbaum was one of its earliest members. In this and the three following volumes are several dissertations composed by him, on many new plants, and among others, the first observations relative to the Flora of St. Petersburg. The activity of the new Scientific Academy contributed greatly to the progress of Botany in Russia, a new epoch for all Natural History pursuits commencing with its foundation, while the patronage which the Empress Anne delighted in bestowing on science, added a fresh impulse to its progress.

J. G. Gmelin, who entered the Academy in 1727, employed ten years in exploring the inexhaustible treasures of Siberia, and his *Flora Sibirica*, in four vols. 4to., with four hundred plates, was the result of this expedition, and by its classical as well as scientific merit, has procured for its author a place among the most celebrated Botanists. While Gmelin was thus engaged in investigating Siberia, Dr. Ammann, an academician, published a remarkable work, under this title, "Stirpium rariorum in Rutheno imperio sponte provenientium icones et descriptiones." It contained figures and descriptions of many new plants, discovered by Messerschmidt, Gmelin, Heinzelmann, and Gerber. The latter had botanized on the shores of the Wolga, while Dr. Heinzelmann explored the environs of Orenbourg and the steppes of the Kirghise. Ten scientific dissertations, contributed by Dr. Ammann to the Memoirs of the Academy, further attest the scientific merits of this botanist.

I turn for a moment from the expedition of Gmelin to speak of his contemporaries, and to discuss their labours. Krascheninikoff, then a simple student, afterwards an Associate, and finally a Member of the Academy, is the first Russian by birth who distinguished himself as a Botanist. Gmelin speaks highly of him, and his journey to Kamtschatka produced many botanical novelties; still his fame chiefly rests on the Flora of Ingria, which Gorter subsequently edited from the writings which he had left.

The scientific labours of Steller are important: his journey from Okotsk to Kamtschatka; the part that he took in the celebrated expedition of Behring, by which he was enabled to visit many hitherto unknown islands, and even to land on the Western coast of North America, his disasters and his residence on Behring's Island, have not been unproductive in botanical interest; many were the new and rare plants which he collected; the single island of Behring affording him two hundred and eleven species; while his journal contains also many important remarks on the vegetation of the countries which he had visited. Still it was not permitted for him to enjoy the success of his exertions, as a premature death carried him off, and prevented him from publishing, or even revising his hard-earned discoveries.

About this period, the ingenious ideas of Linnæus, and the new system of that illustrious author, had brought about a total reform in Botany, and conferred a signal benefit upon science. The influence of these happy innovations was felt in the progress of Russian Botany, for the efforts of the Academician Siegesbeck, who combated this new method were, of course, powerless against the force of truth. In other respects, Siegesbeck was an useful Naturalist, and gave a good deal of information on the Flora of St. Petersburg, and on several new plants. Among the Russian Botanists of this period, Dr. Lerché was peculiarly eminent. In his situation as a military surgeon he visited many provinces of the empire, and paid particular attention to their vegetable productions, corresponding zealously with Count Munich from Caucasus, and imparting to Linnæus and Gmelin the result of his discoveries in Persia.

The Academicians Hebenstreit, Jos. Gærtner, and Laxmann have also laboured to make known the vegetable productions of Russia; and the more celebrated Jos. Gærtner, who subsequently distinguished himself so highly by his classical work on Fruits, was, for five years, a member of our Academy.

The most memorable period in the history of Russian science commences during the reign of the Empress Catherine II.; and Europe long rang with the fame of the extraordinary enterprize which this great sovereign set on foot for the benefit of science. The vast field which she thus opened, was diligently explored by the Academicians, with a success which will ever redound to the glory of this monarch. The names of Gmelin, Güldenstädt, Falk, Lepechin, Georgi, and Pallas, all are connected with the labours of this period; but it is only in so far as they illustrate that branch of Natural History which it is my present province to discuss, that I shall touch upon them.

S. G. Gmelin, nephew of the celebrated Siberian traveller, and the editor of the two last volumes of *Flora Sibirica*, published in 1768, an important work upon the Sea-weeds. This was the first attempt at a history of marine productions, and is still of value, because it contains detailed accounts of some new and extremely rare species, collected by Steller and Krascheninikoff, in the Eastern Ocean. The younger Gmelin explored the sources of the Don and Wolga, the banks of the Caspian Sea, visited Bakou, Derbent, and Enzeli, and during the six years which were occupied in this journey, succeeded in forming very rich collections of plants, especially on the mountains of Ghilan, which Hablitzé had also visited. The melancholy death of this martyr to science, together with other untoward circumstances, forbade the publication of his botanical treasures, which, accompanied by excellent manuscript notes elucidating them, yet remain in the possession of the Academy's Museum. Many of the plants have been selected and described by later travellers. To Hablitzé, who subsequently became the Vice-Governor of Tauria, we owe a physical picture of this Peninsula, and our first ideas respecting its vegetation.

The valuable collections of Güldenstädt, who visited the shores of the Terek and the mountains of Caucasus and Georgia, met with nearly a similar fate to those of Gmelin, death early depriving science of her zealous votary. A posthumous publication of his travels, containing much information on the plants which he saw, appeared soon after his decease, but the descriptions were reserved for a Flora of Caucasus, which has never been edited; the manuscripts of Güldenstädt attest the extraordinary zeal and attention which this botanist paid to the vegetation of the countries which he visited. Many discoveries were also made by the Academicians, Falk and Georgi, as well as by Lepechin, though the latter was rather a Zoologist than a Botanist. The former, who was a pupil of Linnæus, explored successfully the mouth of the Volga, the steppes of the Kalmuks and Kirghises, and the shores of the Irtysch, Tomsk, and Barnaoul. Georgi, who accompanied Falk, also examined the Baikal and a part of Dahuria. This distinguished Naturalist attempted a general view of the vegetable productions of Russia, and considering the time when it was executed, it was not without merit, especially as Bœber, a zealous Botanist, contributed very valuable materials.

But the labours of Pallas far excel those of his colleagues. Himself a man of talent and of extensive information, he appeared at once as a Mineralogist, Botanist, Zoologist, and Ethnographer. His travels extended throughout Siberia and Dahuria; and did his fame only rest upon his botanical labours, it would still rank him deservedly high. The great number of new plants which he described and figured in his travels, his work on the *Halophytes* of the Russian steppes; that on the genus *Astragalus*, which belongs so eminently to Russia; together with numerous other writings relative to this science, place Pallas among the first Botanists of the age. The

Flora Rossica, which he commenced under the auspices of the Empress Catherine II., is a remarkable work, whose imperfect state is much to be regretted. It was intended to contain all the rarest aud most interesting plants of this empire, and to be adorned with five hundred engravings, but the first century alone was published. Twenty-five plates of the second century, or second volume, were executed, but without text, which the Academy is, at the very present time, endeavouring to supply, with the intention of carrying on this great national work, in a style conformable to the present state of science. The Flora of Crimea received some illustrations by Pallas's work upon the geography and natural productions of Tauria. The vegetation of Mongolia was utterly unknown when the Apothecary Sievers had occasion to visit part of that country; he accompanied an expedition that was sent in 1790 to the frontiers of China, with the express purpose of obtaining information on the plant which yields *Rhubarb*, and there he gathered many new and rare plants, of which Pallas, after his decease, described the greater portion. The year 1799 witnessed the appearance of the Flora of St. Petersburg, by Professor Sobolewsky, father of the learned Metallurgist, who is our contemporary.

About this time Botany, which had flourished exclusively in Petersburg, and eminently in the Academy there, seemed willing to grace awhile our ancient capital. Professor Stephan published a sketch of the Flora of Moscow, the first that appeared concerning that city, and which was subsequently followed by that of Dr. Martius. Since the year 1786, the garden of Demidoff, at Moscow, had been famed for its vegetable riches, when a new botanical establishment was founded, which shortly assumed such a character of importance as to attract the attention of Europe in general. This was the garden of Count Razoumovsky, at Gorenki, near Moscow. As it often happens that great events owe their commencement to very trifling causes, so this celebrated establishment first originated in the admiration that its owner felt for a flowering specimen of the *Night-blowing Cereus* (*Cactus grandiflorus*).

Professor Stephan had directed the first operations of this garden, but its future development, its extensive connexions and wide-spread celebrity are due to M. Fischer, who was the director of it until the demise of Count Razoumovsky, with whom this noble establishment was to begin and terminate. The Gorenki Garden had become a depositary for the whole Flora of Russia, the most beautiful and rare plants from all parts of the empire were sent thither, and there were cultivated. The library attached to this institution was rich in valuable and rare works, and now constitutes, together with that of the late Professor Stephan, the foundation of the magnificent library of the Imperial Garden at St. Petersburg, which is perhaps the finest and most complete of its kind which can be seen in Europe. The Phytographical Society at Gorenki was also commenced, where the publication of an important botanical work, and many others which promised to confer great benefits on science, were in progress of execution, when the national disasters of the year 1812 destroyed these, and in part the very garden itself. Hardly had the severe casualties of this period been repaired, when the death of the Count, at a very advanced age, put a termination to the whole. Here let me be permitted to say a few words respecting Count Razoumovsky—I owe this mark of gratitude to the patron of Botany and the man of worth, under whose auspices I have passed some of the happiest years of my life.

Count Alexis Razoumovsky, without having studied Botany deeply, yet being possessed of considerable talent, and animated by a great love for science, had arrived at the acquisition of much knowledge, and being a man of an enlightened mind, enjoying also a stupendous fortune, he made great sacrifices for the promotion of science. The expeditions which were made at his expense to the interior of the empire, by Rédowsky, Londes, Tauscher, and Hermann; the correspondence into

which he entered with Botanists and Collectors, who were dispersed to the extreme parts of Siberia; finally, the cost of keeping up the Gorenki Garden, amounted to considerable sums, the annual expenditure averaging 60,000 roubles, while it sometimes cost the Count more than twice that sum, and even reached to 150,000 roubles. Thus it may be justly conceded, that the Count deserved well of his own country, and that history will long preserve his name in honourable memory.

A taste for Botany having been thus diffused in the Russian empire, its zealous friends, some of whom were found in very distant provinces, contributed to the discovery of new plants, or to a more correct knowledge of those, which had not been sufficiently known, and to their propagation among Botanists. M. Haupt had herborized in the environs of Tobolsk, where he lived several years, and the frequent journeys, which the duties of the service compelled him to make, were productive of noble harvests of plants. M. Rytschkoff, Director of the Mines at Nertschink, collected the plants of Baikal, while M. Vlalsoff, a retired Major in the Army, living at Doroninsk upon the Ingoda, transmitted several valuable collections from Dahuria. A surgeon, called Zalesoff, explored the Altaic Mountains, and made many discoveries, among which the most precious are the plants which he gathered with the younger Schanguin, on the banks of the Tschouia.

Dr. Gebler, at Barnaoul, who has annually sent large collections of plants and seeds from that neighbourhood, still continues to promote, most actively, the cause of Botany and Entomology, and has rendered eminent service to the Altaic Flora. What contributions have been made to Botany, by the Naturalists' Society, founded at Moscow in 1805, by M. Gottlieb Fischer, who still continues to be its worthy Director! To appreciate their value, we ought to read the interesting dissertations which have appeared in its Memoirs, where Stephan, Marschall Bieberstein, Fischer, Steven, Adams, Londes, Helm, Liboschitz, Goldbach, and others, have described many new plants, detected in various provinces of Russia, especially the most remarkable ones of Siberia and Caucasus.

The celebrated Professor Hoffmann, who had been called from Gottingen to Moscow, published in 1813, a work full of new ideas respecting the *Umbelliferæ*, which was brought to light during the author's residence at Gorenki, after the conflagration of Moscow. The publication of an important classical work on the vegetation of Caucasus and Tauria, also proves how great was the advance that had been made in the knowledge of Russian vegetation. Baron Bieberstein, author of a Flora, in two octavo volumes, which appeared in 1808, enumerates two thousand and seven plants; but the rapid subsequent accumulation of new species, has occasioned the addition of a thick supplementary volume, which besides numerous observations, contains three hundred and twenty more plants. The magnificent folio work, with coloured plates, on the rare Caucasian Plants, commenced by the same author under the title of *Centuria Plantarum Caucasi rariorum*, has never been completed. The Academy superintends its continuation, and the sixth décade has already appeared. In this fine Flora, M. Steven bears a distinguished part; his frequent excursions to the Caucasian Mountains, with the deep attention he has given to their productions, having enabled him to make numerous and important discoveries. The Botanical researches of Messrs. Wilhelms at Tiflis, Wunderlich at Sarepta, and of Dr. Hansen, have also added to the value of this Flora.

The Embassy of Count Golownin to China has also proved useful to science. The Academy, eager to avail themselves of such an opportunity, nominated two of its associate members, MM. Adams and Rédowsky, to accompany it, the former as a Zoologist, the latter as a Botanist. Though this mission failed in effecting its immediate object, still the Naturalists who were attached to it, explored the productions of the countries which they traversed,

and were afterwards directed by the Academy to other districts of the empire which it was important to investigate. M. Adams, known by his travels in Caucasus, with Count Mussin Puschkin, having returned from Ourga, the place of meeting for the members of the Embassy, was sent to Irkutsk, whence he was to descend the Lena as far as its confluence with the Icy Sea, and to examine the shores both of that ocean and of the river, collecting in all the three departments of the kingdom of nature. There he made the memorable discovery of the Mammoth, and also brought home a great number of plants, the most interesting of which are described in the Annals of the Naturalists' Society of Moscow. Rédowsky, when he returned from Irkutsk, went to Jakoutsk, and passing over the chain of the lofty Aldan Mountains, arrived at Oudsky-Ostrog. Thence, coasting along, he reached Okhotsk, where he remained till the period for travelling by sledges arrived, in order to follow the instructions of the Academy by proceeding to Kamtschatka, whence he was directed to attempt making successive excursions to the Alentian and Kurile Isles, as well as to those of Schantar and Sachalin. A most toilsome and harassing journey brought him to Ischiginsk, where he miserably closed his mortal career. His collections have been chiefly lost; a small portion however remains with the Academy, and another having fallen into the hands of M. Chamisso, when he resided in Kamtschatka, this great Botanist has published several of its rarest and most interesting species. Many other novelties, collected by Rédowsky, have been described by the Academician Rudolphi.

M. Helm, the Apothecary to the Embassy, brought home fine collections from this expedition, as well as from another which he made to the Ural Mountains, at the expense of the Society of Naturalists; but all these treasures perished in the conflagration of the capital.

The vegetation of Volhynia and Podolia, of the Government of Kieff and Bessarabia, was explored by M. Besser, who published, in 1822, the result of his researches. This Naturalist, then Professor at Kremenitz, now placed in the New University of St. Vladimir, at Kieff, is well known, as a learned and distinguished Botanist; and science has been enriched, by him, with many new plants, and also with exact and judicious observations. His attention is now engaged by a Memoir on the Wormwoods (*Artemisiæ*), destined to form part of the fifth volume of Professor De Candolle's Prodromus. Professor Eichwald, at Wilna, has published a Set of rare Plants, detected in his journey to Caucasus and the Caspian, and a Second Set is in the press, and ready to appear. To M. Karelm, we owe the discovery of many very scarce and novel vegetables, which he gathered on the eastern shores of that sea.

Thus has the study of Botany gradually diffused itself among us, and excited the zeal of Naturalists by the abundance of its productions. One institution, which eminently contributed towards its advancement, we owe to the Empress Maria Federowna, whose memory, dear to Russia, will be ever cherished among us. Botany was one of her favourite pursuits, she felt all its charms. By her, the lovely Garden of Paulowsky was created, where she delighted to spend her leisure hours among its flowers; the contemplation of those charming productions of all countries and all climes, with the variety of their colours and perfumes, elevating her pure mind in adoration to their Creator, and cherishing those religious sentiments and that humane beneficence, which marked the whole course of her blameless life. The organization of this beautiful garden is the work of M. Weinmann, who had distinguished himself, previously, by the success with which he had originated and conducted the Botanic Garden of Dorpat. Many, also, are his claims on the gratitude of Naturalists: he has published many new and rare plants; and no one has investigated the Flora of St. Petersburg with equal care. The study of the Cryptogamia engrosses much of his attention, and to him we owe the first complete Essay on the numerous species of Fungus which grow in this vicinity. This

work is now printing, and is the more important to the Russian Flora, as it treats of a family of plants, the study of which had been previously almost wholly neglected among us.

Another Institution which claims our attention, is the Imperial Apothecary's Garden, on Apothecary's Island, which owes its origin to the distinguished protection bestowed by the Emperor Alexander on this science. Formed on a noble and extensive scale, it has, in some sort, replaced the Gorenki Garden. Prince Kotschoubey, who has already conferred many other benefits on his country, took a lively interest in this garden, and Dr. Fischer, who furnished the plans, was nominated Director of the Institution. While the erection of hothouses and greenhouses was proceeding, the latter visited Germany, Belgium, France, and Great Britain, for the purpose of collecting the treasures they were destined to contain, and returned, laden with such an accumulation of vegetable wealth, that already, at the close of the first year, this establishment exhibited such an assemblage of the plants of all parts of the world, as to surpass, in this respect, the Gorenki Gardens at the period of their greatest splendour. Now, it justly ranks as one of the finest institutions of the kind, and the particular interest that is felt in its prosperity by His Majesty Nicholas I, has caused it to be taken under the patronage of the court, and endowed with truly imperial munificence.

Dr. Fischer possesses an active and able assistant in the person of M. Mayer, whose botanical industry and his title as fellow-labourer in the Altaic Flora, are already well known. The Imperial Garden, being gifted with funds destined for the express purpose of making botanical expeditions, will doubtless avail itself of this advantage, to investigate the vegetable productions of distant and little known countries.

The journey of Szovits, projected by Dr. Fischer after the last war in Persia, was executed by order of His Imperial Majesty. This Botanist first proceeded to Tauris, whence he visited Northern Aderbeitschan, Karabagh, and Russian Armenia. Subsequently, he departed from Tiflis to explore the provinces of Mingrelia and Imeretia, where he fell a victim to epidemic cholera. The rich botanical harvest made in this journey, promises a most interesting work, on which Dr. Fischer and M. Mayer are at this time engaged. Similar researches are now proceeding, at the expense of this establishment, in different parts of Siberia. M. Tourczaninoff investigated successfully the environs of Baikal, Dahuria, and the Mongolian steppes, where his interesting discoveries give us the promise of a Flora of Baikal.

I cannot wholly overlook the expedition in which M. Riedel, formerly travelling companion of M. Langsdorff, is now employed. He is exploring, by order of the Imperial Botanic Garden, the province of Goyas in Brazils, whence he has transmitted the finest collection of living plants that, perhaps, was ever sent to Europe from that country.

We have now seen how the Academy of Science has given birth, as it were, to Russian Botany, and how prosperously its labours were conducted for nearly a whole century. The death of the Academician Smelowsky seemed, however, to paralyze, for a while, its energies, the situation of Botanist remaining vacant for eight subsequent years. Happily, at the expiration of that period, the acquisition of a new President put a period to this interregnum, and the appointment of M. Trinius, who still continues the head of the Academy, revived its botanical progress. This Naturalist who, as an Agrostographist, holds a high rank among authors, has published many distinguished works, succeeded by a *Species Graminum*, of which the two volumes, that have already appeared, only give the more reason to regret that unfortunate circumstances, over which this author has no control, have arisen to delay the continuation of the book.

It suffices to mention some Botanical enterprizes which the Academy has set on foot, from the suggestions of M. Trinius, to prove the zeal with which its labours in

this department are now prosecuted. To him we owe the proposal for sending M. Mertens on the expedition round the world, which was executed by the corvette, the Séniavine, under the command of Capt. Lütke. Though the Academy has had to regret the death of this Naturalist, shortly after his return, yet the botanical collections, which were sent home by him, are not, therefore, lost to the world. All the Grasses have been published; and the plants of Sitka, a Russian Colony on the North-West Coast of America, have been described in the Academy's Memoirs, and furnish a general idea of the vegetation in that interesting part of our possessions. We are in momentary expectation of a little Flora of the Isles of Bonim-Sima, whose vegetation is hitherto utterly unknown. The scientific expedition, despatched by the Academy, in 1829, to Elborous, has furnished M. Mayer with an opportunity to institute botanical researches in this interesting part of Caucasus, and to prolong them as far as the Caspian Sea. He also saw Bakou, and visited the Mountains of Talüsch; communicating, on his return, such a detailed account of this journey, as fully proved the success with which his mission had been executed. Another botanical enterprize, organized by the Academy, has proved equally interesting and useful; it is that of Dr. Bunge, now Professor of Botany, at Kasan, who accompanied the Ecclesiastical Mission to Pekin, and brought home a beautiful collection of new and rare plants. His important dissertation on the vegetables of those countries which he traversed, has been published by the Academy. With this expedition to China, it was deemed advisable to combine another, the object of which was to explore the great chain of the Altaic Mountains. M. Bunge, on his return from Pekin, turned his attention with so much success towards this point, that about three hundred and fifty species of plants were discovered, among which were many entirely new ones that will form a valuable Supplement to the *Flora Altaica* of M. Ledebour.

I have already stated that the Academy charges itself with the continuation of Baron Bieberstein's beautiful work on rare *Caucasian Plants*, and also proposes to carry on Pallas's *Flora Rossica;* but, I must further state, that there is a project in contemplation for publishing a *Prodromus of the Russian Flora*, for which the aid of our most eminent Naturalists is engaged by the Academy, under whose auspices it will appear.

The rich botanical stores of Brazil, received from M. Langsdorff, when a Member of the Academy, have already furnished materials for many of its printed Memoirs. Trinius has described all the *Gramineæ* of this collection, and the author of the present Essay commenced his botanical career by writing a *Monograph of the genus Eriocaulon*, by describing several new species of *Bauhinia* and *Paulletia*, and revising the genus *Lacis*. Among the most recent and eminent publications on Botany, the *Flora Altaica* of Professor Ledebour, at Dorpat claims a distinguished place. This Flora displays to view the striking productions of the Altaic chain of mountains, and contains no fewer than one thousand six hundred and twenty-six species of plants, natives of that remarkable part of the Russian dominions. The work, forming four octavo volumes, possesses scientific merit of the highest order, both as regards the numerous novelties which it presents, and the admirable execution of its various parts. The diagnoses of the genera and species are executed with great talent and extraordinary precision, and give a high idea of the present state of science in our country. The folio work, with coloured engravings, is beautifully executed, and will be shortly completed.

I have already had occasion to speak of Professor Ledebour's able assistants, M.M. Bunge and Mayer, the worthy pupils of this eminent Professor.

It would occupy me too long a time to notice all the elementary works on Botany which have been published in Russia, and which have powerfully contributed to promote the study of this charming science.

The names of Severguin, Ambodick, Smelowsky, Dwigoubsky, Petrow, Martinow, Goräninow, Maximovitsch, and several others, suffice to attest their merit.

In now terminating this sketch of the rise and progress of Botany, in Russia, I think I have proved that this branch of Natural History is by no means neglected among us; that its study has followed, with progressive steps, the course of science; and that the latter owes many and important discoveries, to the labours of its Russian votaries. They it is who have made known the numerous vegetables that clothe the surface of this vast empire; and who have furnished the most valuable materials towards the Geography of Botany.

It must, perhaps, be admitted that *Phytotomy* and *Vegetable Physiology* have not derived equal advantages from the labours of our Botanists; a circumstance probably owing to the enormous mass of hitherto unnoticed productions which claimed their attention, and left them little leisure to attend to the advance of these more abstruse and theoretical branches of the science.

The investigations of the Academician Kölreuter, however, on the subject of the fecundation of plants, are too important to be overlooked; he it is who proved, to very demonstration, the sexuality of vegetables, and cleared up many difficult points respecting their fecundation, while his admirable experiments upon hybrid plants have proved most interesting and important to science. Nor can I neglect to mention a *savant,* whom Russia possessed, and with whom originated the idea of the metamorphoses of plants. Göthe, who brought them into notice, acknowledged that he was indebted for them to the Academician Wolff, a man of commanding talent, whose writings first hinted at this fact. Russia, consequently, may claim the honour of the discovery. It may perhaps be said, many as are the foreign names that appear among the Botanists of Russia, that, properly speaking, this science owes its advance among us to strangers. But is it not true, that these very strangers were either brought up in Russia, or like me, had received there an honourable welcome and an adopted country? Thus by their noble and useful works, they have paid their debt of gratitude to the generous and enlightened sovereigns, who encouraged them to settle in their dominions, and under whose auspices so many scientific enterprizes and voyages of discovery have been undertaken, the entire honour of which appertains to Russia.

May the unintermitted and enlightened efforts of this government be always crowned with equal success, in the diffusion of useful knowledge!

BOTANICAL INFORMATION.

(Continued from p. 86.)

The indefatigable Professor of Botany in the London University, Dr. Lindley, has just published, almost at one and the same time, a new edition, with corrections and numerous additions, of his valuable "*Introduction to Botany;*" a new edition of the "*Synopsis of the British Flora,*" also, "with numerous additions, corrections, and improvements;" and a new work entitled, a "*Key to Structural, Physiological, and Systematic Botany, for the use of Classes:*" all of which we cordially recommend to the attention of students and every one interested in the advancement of the science on which they treat. The object of the latter work is best explained, in the author's own words, in the preface.

"The idea of this book was suggested to me by the difficulty experienced by all teachers, in explaining to their students what are the most prominent and important points in Botany, on which to fix their attention. I found that when axioms are thrown into an extended and descriptive form, and mixed up with discussions which are only incidental to them, the student is apt to lose sight of the exact nature of the argument, and to confound different phenomena, from want of the power of disentangling the more essential from the less essential subjects. It is clear that, with-

out a distinct perception of the exact nature of the first principles of any science, no one can hope to apply it to practical purposes with any probability of success.

These considerations originally led to the publication of my *"Outlines of the First Principles of Botany,"* wherein the fundamental propositions upon which the principles of Organic and Physiological Botany depend, were stated as briefly as the nature of the subject would permit. The success with which this little book was received, and its recognized utility to students, whatever its defects may have been, induced me to attempt the far more difficult task of reducing the definitions employed in the higher part of Systematic Botany to their simplest form, and to show that the impediments which accompany this branch of the science are susceptible of being very materially diminished by a careful and extensive kind of analysis. The *"Nixus Plantarum"* was written with the view of putting to the test the possibility of executing such a plan; and it has been extremely satisfactory to me to find that this work also, although, in many respects, totally unsuited to the use of students, has nevertheless been, in many cases, employed by them with singular advantage.

"As both the *'Outlines of First Principles'* and the *'Nixus'* are out of print, I have determined to combine them into one work,—a sort of Botanical Note-Book,—wherein all the principal topics which the teachers of Botany either do, or ought to, introduce into their lectures, are arranged methodically. The student will naturally look to his instructor for explanations and illustrations of the work, and for the exposition, in detail, of those points which in his Note-Book are merely adverted to.

"In the systematic part, I have endeavoured to secure as much distinctness in all respects, as the resources of printing would supply, knowing, from experience, how difficult it is to convey to the mind a clear and distinct impression of any thing which is presented to the eye in a state of confusion. I have also ventured to reform the language of Botanists in some respects, by carrying out their own principles to their full extent; thus securing a more uniform kind of nomenclature, and expressing the value of the names of the Classes, Orders, &c., in all cases by the manner of their termination."

It is stated in the Botanical Magazine, folio, 3284, regarding the very pretty *Anthyllis Webbiana*, that it was introduced by Mr. Webb, "from *Teneriffe:* this is a mistake, and we have the authority of Mr. Webb himself for stating, that he gathered the seeds, in 1827, on rocks near the summit of Sierra Tejada, a chain of mountains running almost parallel with the Sierra Nevada, near Alhama, in the kingdom of Grenada. It was growing in company with *Cerasus prostrata*, and many other interesting plants. The same accomplished Naturalist observes that the *Anthyllis* found by Bory de St. Vincent, in Teneriffe, is certainly only *A. vulneraria*, as no other species of the genus exists there.

We are much gratified to find that M. Du Rieux, a French Botanist, to whom Mérat dedicated a Spanish Genus, (which however, had already been described by Lagasca, under the name of *Lafuentea*,) has been herborizing in Spain, and exploring the vegetable productions on both sides of the Austrian and Galician range. He has accomplished his journey successfully, though not without danger. An aged Botanist, named Perey, who was the unsuccessful competitor with Ortega for the Botanical Chair of Madrid, saved him from the calabozo (dungeon) at Oviedo, to which the civil governor was about to consign him. His Collection amounts to about three hundred and sixty species. The country visited is, perhaps, not rich in number of species; but there cannot be a doubt of there being many highly interesting plants. We hail with delight any attempt to make us better acquainted with Spanish Botany: for it is that country, which, of all Europe, is the least known to

us; and which, from its southern latitude, and the great elevation of its mountains, cannot fail to be of a very peculiar character. M. Du Rieux found Oranges cultivated in the open air, and the *Woodwardia radicans* wild on the rocks in the neighbourhood of a small port between Bayonne and Xixona.

Don Ramon de la Sagra, late Superintendent of the Royal Botanic Garden at Havana, (the country that proved so fatal to poor Drummond,) and author of a work entitled, "*Historia economico-politica y estaditica de la Isla da Cuba*," &c., is arrived at Paris, with large collections of Plants and Insects, which he proposes to publish. M. P. Alex. Auber, who, when with M. Berthelot and Mr. Webb in the Canaries, discovered a new species of *Echium*, (*E. Auberianum*, Berth. & Webb,) is appointed to succeed him in the Garden at Havana.

OBSERVATIONS ON BRITISH PLANTS.

Veronica *polita, Fries, and Brit. Fl. ed.* 3. *p*. 8.—" Bertoloni, in his *Flora Italica*, *v*. 1. *p*. 101, gives our *V. polita* under the name of *V. didyma*, Tenore, and refers to it *V. agrestis*, Curtis, which I have (erroneously he says) quoted under *V. agrestis*, Linn. Perhaps he is right as to the figure. The description, in part at least, must have been made from *V. agrestis*." Borrer *in litt*.—I fear that in this and many others of our plants lately raised to the rank of species, we are splitting straws; and the consequence is that if we know what we mean ourselves, other Botanists will not so easily comprehend them.

Fedia *olitoria*.—" Well distinguished from our other species, by the thickened bark of the fertile cell. The fruit of *F. Auricula*, is added to the figure of *F. olitoria* in *Fl. Lond. ed.* 2.—To *Fedia auricula*, *Br. Fl. ed.* 3. *p*. 24, may be added β. (*Woods, MSS.*) *F. tridentata*, " Steven," Reich. *Ic. Bot. t.* 64.—*Valerdanella dentata*, De Cand. *Prodr. v.* 4. *p*. 627.—α. Hastings, in fields below Ore Lane, *Dr. Broomfield*.—β. Landulph, Cornwall. *Rev. R. T. Bone*." Borr. *in litt*: —but Mr. Borrer observes, that the two varieties are scarcely worth distinguishing.—We anxiously await the publication of a paper on this genus, which Mr. Joseph Woods has lately sent to the Linnæan Society.

Crocus *speciosus*, Bieb. — Hook. *Br. Fl. ed.* 3, *p*. 25. — Of this Mr. Borrer observes, " Mr. Wilson's plant is merely *C. nudiflorus* with the style a little lengthened; but Reichenbach figures a very different thing as *C. speciosus*." This is very true of Reichenbach's figure, but Mr. Wilson's specimens are compared with authentic ones, in my Herbarium, from Tauria and Caucasus, and they are identically the same. As to Reichenbach's plant, it is from Krassova, in the South-east of Hungary, and has the three outer segments of the perianth very large, broad, and obovate, spreading, the three inner much smaller erect, and lanceolate, as in *Iris!*—so that the author remarks upon it, " Planta omnino speciosa, genera quorumdam affinium perianthii heteromorphium exordiens, partitiones externæ lilacinæ, internæ albæ!—Transitus ad Irides."—Our plant is found in the Pyrenees, and is distributed by the *Unio Itineraria*, as " *Crocus nudiflorus* Sm. In Monte Rion, Pyr. Orient. *Endress*. Sept. 1830." The " *Crocus speciosus*, Bbrst. (*C. nudiflorus*, Sm. ?) in graminosis Georgiæ Caucas. *T. F. Hohenacker*, 1831," of the same collection, is truly *C. nudiflorus*; as is also the " *C. nudiflorus*, Sm. In pratis alpinis, Pyren. 4600—5000 Ind. Endress. 1829," also of the *Unio Itineraria*.

Scirpus *Savii*, Spreng. — Hook. *Br. Fl. ed.* 3. *p*. 28.—Since I have directed the attention of our Botanists to this well-marked species, it has been found by various individuals in Ireland and on the Western side of England and Scotland; so that it may be considered as occupying nearly the same range of country as *Pinguicula Lusitanica*; its most

easterly station being at Knowle, Isle of Wight: *Mr. Borrer* also finds it in Devonshire, *Miss Warren* in Cornwall, *Mr. W. Wilson, Mr. Babington,* and *Mr. Borrer* in Wales; in the Isle of Man, *Mr. J. E. Bowman;* Coast of Galloway, Scotland, *Dr. Graham* and a party of his pupils. In Ireland, like the *Pinguicula* just mentioned, this *Scripus* is, perhaps, universally distributed; since, in addition to localities in the West and South of that island, it has been gathered at Howth and Oughterara, West of Galway, by *Mr. Babington.*

Elymus *geniculatus.*—May this not be a diseased state of *E. arenarius?* An *Elymus*, which I cannot distinguish from it, was sent to me some time ago, by *Dr. Murray*, of Aberdeen, from Fifeshire, and again lately from the same locality, by *Mr. Gilbert Macnab.*

Eriophorum *gracile*, Auct. Brit.—"I am convinced that our Scotch and Welsh plant, which I find also in Sussex and in Surrey (whether distinct or not from *E. angustifolium*), is not the *E. gracile* of foreign botanists. I have a Lapland specimen of the latter from Swartz. It has a taller culm, and rough spike-stalks, and the spikes have shorter leaves, as in *E. pubescens.*" *Borrer in litt.*—I shall be thankful if any competent Botanist will furnish characters, and clear up the synonyms which belong to our many-spiked *Eriophora.*

Eleocharis *multicaulis.* — Sheaths of the stem oblique, with a small point, which is wanting in *E. palustris.* Spike often proliferous. *Borrer in litt.*

Mr. Wilson observes, that the pale spikelets distinguish it, at first sight, from *E. setaceus*, with which it often grows in company, and that the stamens are always three.

Viola *suavis*, M. Bieb.—This is introduced into Professor Lindley's Flora, on the authority of Mr. Leighton, as found on Shakespeare's Hills, in Shropshire, but with the remark, that "it is a white var. of *V. odorata*, without hairiness on the petals."

Lobelia *urens.* The Ottery St. Mary station, we are assured on the authority of Mrs. Griffiths, is a mere escape from her garden. In the station near Axminster, it is confined within very narrow bounds.

Daucus *maritimus*, With. (not Lam.)—Mr. Borrer considers the *D. Hispanicus*, De Cand. and *D. gummifer*, Lam., to be synonymous to this.

Herniaria *glabra.*—The ciliated almost spathulate leaves distinguish the Cornish plant from the Suffolk one, which is the true *H. glabra.* I have never seen the supposed British *H. hirsuta.* The foreign one is satisfactorily distinct. Mr. Babington is directing his attention to this subject, and it is expected will give a paper upon it to the Linnæan Society. *Borrer.*

Polygonum *maritimum*, Linn.—Mr. Borrer has found this plant, new to the British Flora, on the sandy shore, near Christchurch, Hants, "with the leaves indeed, less acute, and the nerves of the stipules less numerous than in my foreign specimens."—The same accurate Botanist agrees with me in the opinion I expressed (*Br. Fl. ed.* 3. *p.* 185.) that my maritime *var. β.* of *P. aviculare* is truly a distinct species. "It comes near to *P. aviculare* in the stipules, but agrees with the true *P. maritimum* in the fruit. I have found it this year in Lhwd's Anglesea station, and the Rev. T. Salway had sent it me from Barmouth. Mr. Babington has found it on the sands at Killiney, Ireland. Dillenius's Sussex habitat, is long since gone into the sea."

Rosa *Wilsoni*, Borr. *in Br. Fl. ed.* 3. *p.* 231, and *Eng. Bot. Suppl. t.* 2723.—Professor Lindley's remark on this, is worthy of attention. "This seems one of the endless varieties of *R. mollis*, approaching *R. Doniana*, in the presence of setæ on its branches; and proving among other things, that *R. involuta, Doniana, Sabiniana*, &c. are all one and the same natural species."

Orobanche *caryophyllacea, Br. Fl. ed.*

3. *p.* 293.—The Devonshire station, of Mr. Borrer, is to be expunged. It was at first, only seen from a distance; but, on afterwards reaching the plant, it was ascertained to be *O. minor*, with a white flower.

Matthiola *incana* (flowers pale dull red). —Cliffs between Steep Hill Cove and Ventnor Cove, Isle of Wight. *Borrer.*

Hieracium *Lawsoni.*—Mr. Borrer queries if this be distinct from *H. villosum.*

Crepis *tectorum*, Sm. and *Brit. Fl.*—"All that I have seen of British growth is *C. virens.*—The true *C. tectorum*, Linn. is decisively distinguished by the rough and beaked fruit. I have gathered it in Normandy." *Borrer.*

Carduus *crispus*, Linn. — This plant was introduced into the British Flora on the authority of specimens gathered at Reigate Hill, Surrey, by Mr. W. C. Trevelyan; and very lately my obliging friend, Mr. J. E. Bowman, of Gresford, near Wrexham, has sent me what seems to him to agree with the character of the same plant, (from that neighbourhood,) rather than with the *C. acanthoides.* Both these plants are, I doubt not, correctly referred by these gentlemen to *C. crispus:* but then I think, upon investigation, it will appear that if the two species be distinct, that which generally goes by the name of *acanthoides* with us is, in reality, the *crispus* of Linnæus, who is the original authority for both. On referring to the *Species Plantarum*, we find the essential character of the two species thus given; "*C. acanthoides;* foliis decurrentibus sinuatis margine spinosis, calycibus pedunculatis solitariis erectis villosis."—"*C. crispus;* foliis decurrentibus sinuatis margine spinosis, floribus aggregatis terminalibus inermibus:"—and again in the remarks on *C. acanthoides*, Linnæus says "differt a *C. crispo* calycibus solitariis villosis." Now it is quite clear that this character of "*pedunculated solitary flowers*" does not accord with the notions we have of *C. acanthoides.* Curtis gives an excellent representation of our plant under the name of *C. polyacanthus.* Sir James Smith alters the Linnæan character, and says "calycibus globosis subpedunculatis" (*Fl. Brit.*), and, again, in the description, "flores plerumque pedunculati." In the specific character in *Eng. Bot. t.* 973, the expression is "calyx globose, not quite sessile:" in the description, "flowering branches terminating in irregular clusters of purple, erect flowers, generally on short partial stalks;" whereas the figure which accompanies the description represents the flowers as aggregated and completely *sessile.* In *Engl. Flora* the expressions are, "flowers aggregated, somewhat stalked," and "flowers crowded at the top of the branches," to which is added the observation, that "this species, before the Herbarium of Linnæus came to England, was generally taken for his *crispus*" (as by Hudson, Lightfoot, &c.); "but the leaves of the latter are white and mostly cottony underneath; its calyx-scales more leafy and erect, the inner ones coloured." Willdenow adopts, from the *Flora Britannica*, Smith's specific character of *C. acanthoides*, and does not at all help to clear up the difficulties. The *Flora Danica* figures represent *C. acanthoides* with narrower, more deeply divided, and more bipinnatifid leaves than in *C. crispus;* differences not so much as hinted at by cotemporaneous authors:—the inflorescence is almost exactly the same in both. Schkuhr's figure of *C. acanthoides* is quoted for the *C. crispus* by Professor Lindley, and it quite agrees with the *Eng. Bot. acanthoides:* De Candolle and Dubis, *Botanicon Gallicon*, observe of *C. acanthoides*, "vix a precedenti (*C. crispo*) distinctus." Wahlenberg (*Flora Suecica*) makes the character, as Linnæus did, chiefly to depend on the "peduncles and calyces being solitary," while Reichenbach increases the difficulty by multiplying the species, keeping up *C. polyacanthus* of Curtis as distinct from *C. acanthoides.*

The only specimen in my Herbarium

which accords with the Linnæan character of *C. acanthoides*, is a Swiss plant from Schleicher, marked "*acanthoides*." The flowers are truly solitary and pedunculated; the peduncle, above the uppermost leaf, two to four inches long, and not at all winged. Schleicher's *C. crispus* is like our *C. acanthoides*, save that the leaves are broader, softer, and less deeply pinnatifid, and the scales of the involucre are less spiny: the leaves white and downy beneath: probably the *C. crispus β. integrifolius* of *Reichenb. Fl. Excursoria.*

From all that I have said, I think it will be clear that our *C. acanthoides* is the *C. crispus* of Linnæus and of most continental Botanists; and if the species are really distinct, that name ought to be retained to our plant; but I am myself inclined to the opinion that they are merely varieties of each other, of which the *C. acanthoides* of Linnæus is the less frequent form, so unfrequent, indeed, that succeeding Botanists have modified the character till it insensibly passes into *C. crispus.*

Habenaria *bifolia*. *Br. and Br. Fl. ed.* 3. *p.* 376.—This is the *Orchis bifolia* of Linn, *O. bifolia*, var. *β.* Sm.—*O. bifolia*, *β.* brachyglossa, Wall. — *Platanthera brachyglossa*, Reichenb.—Borr. in litt. —Professor Lindley makes the *brachyglossa* his var. *β.* of *Platanthera bifolia;* "anther emarginate, lip somewhat shorter, leaves obtuse, very much tapering to the base."

Habenaria *chlorantha*, Brit. Fl.—*Platanthera chlorantha*, Curt. *Lind. Syn. Suppl. p.* 330, who observes, "that its large greenish flowers mark it at first sight, and the peculiar form of the anther (very broad with diverging lobes) affords a certain mark of recognitien. To this should be referred *Orchis bifolia* (*α.*) Sm. *English Bot.* and Curt. *Fl. Lond.*— "It is chiefly a wood plant, although it occurs also in chalky downs. *H. bifolia* grows in *forest* woods and heaths. Both are common in Sussex in their appropriate stations. They differ in the foliage. I have never seen *P. bifolia*, Reichenbach." *Borr. in litt.*

Liparis. "Reichenbach's objection to this name, that it was previously given to a universally received genus of Insects, seems decisive against its being retained for the *Ophrys Loeselii*, Linn." *Borr.*—Such coincidences must frequently occur, and, although they ought to be avoided as much as possible, yet they do not appear to me to be productive of any serious inconvenience. In the present instance I believe it will be found that the termination of the two words is different, *Liparus*[1] in Entomology. A greater objection to the name might perhaps be found in the circumstance of there being already a *Liparia* in Botany among the *Leguminosæ:* all these words are derived no doubt, from the same common root: but names invented by Richard, sanctioned by such high authority as Brown and Lindley, and which have now obtained general currency, should not be changed, except on the most substantial grounds, such as I think do not exist in the present case.

Zannichellia *palustris* and *dentata*.—In the fourth volume of Sir James Smith's *English Flora*, p. 70, we find the following observation under *Zannichellia palustris*.—"*Z. dentata* of Willdenow, separated by him at my suggestion, from our British plant, was long ago well distinguished by Micheli, *t.* 34. *f.* 2, and if he be correct as to the two cells of its anther and the toothed stigmas, nothing can be more distinct. It may probably be found in England." Such a *Zannichellia* has been found in England, and will probably prove to be far from uncommon, as it was detected almost at the same time by Mr. J. E. Bowman, at Gresford, near Wrexham, Denbighshire,

[1] At least the genus of Insects, among the *Coleoptera*, established by Olivier, is *Liparus*. Ochsenheimer has a genus *Liparis* among Lepidopteræ, to which probably Reichenbach alludes: it is the *Arctia* of some others. *Hypogymna*, Hubner, Stephens, Kirby, &c. And even *Liparus* is now called *Molites* by *Schoenherr* and *Stephens:* so that neither *Liparus* nor *Liparis* seems to be employed among Insects. *Liparis* is, however, a name given by Pliny to a kind of fish, and it has recently (according to Stephens) been restored to a genus in Ichthyology.

and by Mr. Johns, in Cornwall, and has been mentioned to me by Miss Warren and others. But it remains to be considered how far the species are really distinct; though it must be confessed that, to speak decidedly on the point, recent specimens should be examined, which are unfortunately not within my reach. Both Mr. Bowman and Mr. Johns have, however, sent me drawings as well as specimens of the supposed *Z. dentata*, and both agree in these particulars, that the stigma is large, membranous, and toothed, the peduncle and pedicels of the capsules so short that they may be said to be wanting; the fruit is nearly sessile, the anthers are two-celled, and, according to Mr. Bowman, the embryo consists of six to seven folds. In *Z. palustris*, drawn by Mr. Bowman, the capsules are decidedly pedicellate and seated upon a distinct common stalk; the stigmas, though large, are entire; the anther is distinctly four-celled, and the embryo has usually only four folds. "Is it not possible, however," as Mr. Bowman observes, "that notwithstanding the decided way in which Sir James Smith pronounces it distinct, it may be but a variety of *Z. palustris?* Water-plants seem less constant than others, as may be witnessed in the leaves of *Potamogeton*, of which I think we make too many species.

The value of the character derived from the number of cells of the anther will be considerably lessened by the statement which has been made lately by Mr. Babington, that *Z. palustris* is sometimes seen with two, three, and four cells on the same plant. The toothing of the stigma is undoubtedly variable, and not confined to the sessile-fruited *Zannichellia;* the number of folds in the embryo cannot be considered essential, as they vary in both: so that we have only the sessile or stalked fruit by which the two kinds can really be distinguished, and these marks seem constant to the respective individuals: but this forms no part of Micheli's character, and therefore cannot be made a distinguishing feature of his plant, the original *dentata*, where the capsules are just as much pedicellate as in his *Z. palustris*. I think, therefore, the *Z. dentata* of Micheli, Willdenow, and Smith, is merely a state, I cannot even call it a variety, of *Z. palustris*. Upon very slight grounds indeed Reichenbach reckons no less than six species! all of which I doubt not may be found in our ditches and slow streams.—1. *Z. palustris*. Mich. (not of others) only known, as it would appear from Reichenbach, by figures, is chiefly characterized by the presence of a campanulate *spatha;* which indeed may readily be seen in the flowering state in our *palustris*, and is correctly represented in Mr. Bowman's accurate drawing.—2. *Z. repens*, Reich. *Ic. Bot. t.* 756; radicans, filamento germina vix superante, stigmatibus repandis, nuculis subsessilibus lævibus vel dorso multicrenulatis.—3. *Z. polycarpa*, Nolte.—Reich. *Ic. Bot. t.* 757; nuculis sessilibus lævigatis dorso cristatis repando-multidentatis, stylo demum lævissimo.—4. *Z. gibberosa*, Reich. *Ic. Bot.* 759; foliis tenuissimis, nuculis stipitatis utrinque cristatis repando-dentatis. — 5. *Z. pedunculata*, Reich. *Ic. Bot. t.* 760; foliis tenuissimis, umbella pedunculata, nuculis basi truncatis longe stipitatis dorso cristatis repando-spinulosis lævibusve.—6. *Z. major*, Bönninger.—Reich. *Ic. Bot. t.* 758; foliis ternis longissimis, nuculis breve stipitatis dorso crista continua. To the latter, this author refers the *Z. palustris* of English Botany.

Aspidium *cristatum*, L.—This extremely rare and most distinct *Fern*, of which so few stations are known in Britain, has recently been found in Coxton bogs, Notts., by *Dr. Howitt.*

Asplenium *alternifolium.*—Between Perth and Dunkeld. *Mr. Gilbert Macnab.*

Lunularia *vulgaris*, Micheli.—*Marchantia cruciata*, Linnæus.—This was found by Dr. Taylor, at Dunkerran, in 1832, and sent to me, thus named, in May, 1833, by that gentleman; and Mr. Wilson, having in July, 1835, gathered perfect fructification of his *Marchantia? lævis* (*Brit. Fl. v.* 2. *p.* 103.) "in moderate

plenty behind a piece of rock-work in his garden," at Paddington, near Warrington, we have the satisfaction of recording it as the same plant; the *Marchantia cruciata*, Linn., *Lunularia vulgaris* of Micheli, a genus well distinguished from *Marchantia* by its deeply four-valved capsules (as in *Jungermannia*) and their *cross-shaped* receptacle. "The stalk of the receptacle is succulent, white, beset with filaments, and at the base with numerous, membranous, imbricated scales, which are much laciniated at the summit. Gemmiferous *scyphi* lunulate. Male receptacle sessile, or rather imbedded, with an erect, prominent, membranous margin, not formed of the epidermis of the frond." *Wilson.*

Riccia *natans*. "This is abundant in many pits about Gresford, but I have never succeeded in detecting any fructification. When this most singular plant lies upon the surface of the mud (after the evaporation of the water on which it floated) it soon loses all the long and beautiful fimbriæ which spring from its under surface, and also the two horizontal fasciculi or plumy processes issuing from the broader end of the frond; and, in lieu of these, that portion of the lower surface which is in contact with the mud throws out silky fibrous roots, and the free portion is covered with short lanceolate scales. It also loses its long projecting conical end, the sides of the frond fall outwards into the same plane with the central portion; the whole frond becomes larger and greener; and I am half inclined to think it only an aquatic state of *R. chrystallina*." *J. E. Bowman in litt.*—The circumstance of the aquatic state being found in fruit in North America (see Bot. Misc. v. 1. p. 41. t. 22.) would seem to militate against this supposition; as also the fact that, although the *R. chrystallina* is abundant in Scotland, *R. natans* has never been found with us. The subject, however, deserves to be further studied by those in whose neighbourhood the *R. natans* grows.

Riccia *fluitans*. (TAB. IX.) No one in any country appears to have noticed the fructification except Lindenberg, a German, till Mr. W. Wilson lately found it in Cheshire, and has kindly communicated to me the drawing which is here engraved, and the following specific character and description.—*R. fluitans*; frond plane thin, repeatedly forked, segments linear obtuse, fruit tumid beneath.—This species is usually found floating, but when fertile, is firmly attached to the soil in situations that are inundated during winter, where it forms extensive matted patches, becoming more tumid and less subdivided in proportion to its prolific tendency, and throwing out numerous fibres from the whole lower surface of the frond, whose divisions are slightly thickened in the middle, with obtuse margins, semipellucid, and sheathed at the apex with a few membranous scales. *Capsule* globose, usually solitary, sometimes two together, at first concealed within the frond, its ascending *style* lodged in a foramen opening at the upper surface, at length very prominent beneath, when ripe, dark purple, containing about thirty quaternary clusters of roughish *seeds* of the same colour, coated with a pellucid membrane. *Anthers* imbedded in imperforate cells of the same frond, oval and pellucid. Lateral innovations from the lower side of the frond are occasionally found. The fructification is indeterminate in position, but never found exactly at the forks.—Found in Cheshire, September 1831. *W. Wilson.*

TAB. IX. Fig. 1. Shows a single frond at the extremity of a patch. 2. Fronds slightly matted. 3. Fertile Fronds. 4. Ditto as seen loose in water. 5. Portions of a fertile Frond, in different positions—*magnified*. 6. Frond with anthers and innovations. 7, 8, 9. Fructification at different stages—*magnified sections*. 10. Portions of Capsule and Style—*highly magnified*. 11. Seeds. 12. A cluster of Seeds as they at first appear, in fours. 13. Pistillum in an early stage—*highly magnified*. 14. Section of a Frond containing both kinds of fructification.

Gymnostomum *obliquum*. — Hymenostomum obliquum. *Nees*, *Hornschurch*, and *Brid.* Apparently a very excellent species, allied to *G. microstomum;* was found in Cheshire, by Mr. Wilson, in 1834.

Gymnostomum *rutilans*. Hedw.—Hymenostomum rutilans, *Brid.* Was found by the same indefatigable Botanist, in May, 1835.

INTELLIGENCE RESPECTING THE UNIO ITINERARIA.

The *Unio Itineraria*, supported by the liberal patronage of His Majesty the King of Wurtemberg, having arranged the plan of a journey to Egypt and Arabia, for the purpose of collecting objects of Botany and Natural History, we, the under-signed, fixed upon *Dr. Wiest* and *Mr. Schimper*, as persons well qualified for the task. They accordingly set out for their destination in the month of September, 1834, and spent the winter months at Cairo, collecting whatever was interesting in a scientific point of view, throughout the surrounding country; when Dr. Wiest being unhappily seized with the plague, his life fell a sacrifice to this malady. More fortunate than his companion, M. Schimper, who had formerly collected for the *Unio Itineraria* at Algiers, proceeded, early in March, to Suez, and being fully equipped with all the necessary materials for his employment, he directed his course into Arabia Petræa, stopping for a short time at El Tor, on the shores of the Red Sea, and afterwards fixing his head-quarters at the Convent of St. Catharine, on Mount Sinai, whence he made excursions to the surrounding mountains and valleys, from the end of March to the close of summer. The produce of his labour consists of about thirty thousand specimens of dried plants, together with a variety of seeds. These were transmitted, partly to Cairo and partly to Alexandria, while M. Schimper continued collecting at Mount Sinai, and five packages have already arrived safely at the Port of Trieste. As far as can be judged at present, this expedition is likely to contribute greatly towards the extension of Natural Science, particularly Botany, many of the plants being either new or little known. But as the expenses of this undertaking are not yet covered, and as M. Schimper is desirous of augmenting his stores by penetrating further into Upper Egypt or Syria, we hereby invite, not only our present subscribers, to double, if possible, their subscriptions, if they wish to obtain a full share of this valuable and rare collection, consisting, the greater part of Arabian, aud a smaller portion only of Egyptian plants; but we also beg to acquaint those who have hitherto not been among the regular subscribers, that there are single shares at 60s., or double shares at 120s., still remaining open; and we promise that a single share will produce at least two hundred species. Those who may wish to receive also specimens, to the number of about forty-five, of those plants which were gathered on the island of Cephalonia, where the collectors were detained by shipwreck, will have to add 10s. more to the amount of their subscriptions.

We further request leave to state, that specimens, from the Georgian Caucasus, put up in fasciculi, and ticketed, lie ready for distribution, at the original price of 48s. for two hundred, or 40s. for one hundred and seventy species; while to those who have formerly subscribed for similar plants, we beg to observe, that a fresh supply from the same quarter has partly arrived, and is partly on the road, for which the price is fixed at 30s. for one hundred species; this higher charge being occasioned by the greater scarcity of the plants themselves, and by the more remote distance at which they were collected. Subscriptions are also open for single centuries of Chilian specimens at 30s. per hundred; besides others from the States of Ohio and Pennsylvania, at 22s. per hundred.

Prof. Ch. F. Hochstetter.

Dr. E. Steudel.

Esslingen, Nov. 1835.

NEW BOTANIST'S GUIDE AND GEOGRAPHY OF BRITISH PLANTS.

Two highly interesting works, which promise to be eminently useful to the British Botanist, have just appeared from the pen of H. C. Watson, Esq., the one entitled "Remarks on the Geographical Distribution of British Plants, chiefly in connexion with latitude, elevation, and climate"—the other, "The New Botanist's Guide to the localities of the rarer Plants of Britain, on the plan of Turner and Dillwyn's Botanist's Guide, Vol. I., England and Wales."—In regard to the first of these publications, it contains, as may be expected from the author of "Outlines of the Geographical Distribution of British Plants,"[1] a mine of valuable information, partly the result of Mr. Watson's many personal observations in various, and especially the mountainous, districts of Great Britain, and partly derived from the communications of others, and from consulting an immense number of works bearing upon his subject. The following list of contents will convey some idea of the variety of topics treated of in this book.—I. Remarks on the Physical Geography of Britain; 1. Extent and Position; 2. Elevation of Surface; 3. Climate, Temperature, Rain, Progress of the Seasons, indicated by that of Vegetation.—II. General Remarks on the Flora and Vegetation of Britain; 1. Numerical Estimate; 2. Botanical Character.—III. Remarks on the Data for determining the distribution of Plants in Britain.—IV. Remarks on the Distribution of Plants in Britain; 1. Distribution in Ascending Regions—Region of the Plains, Upland Region, Median Region, Subalpine Region, and Alpine Region; 2. Distribution, in connexion with Altitude, in the Highlands of Scotland, in Cumberland; 3. Distribution, in connexion with lines of Latitude and Longitude; 4. Distribution, in connexion with Geographical or Local Position.—V. Remarks on the Distribution of Plants over other countries.—Then follows an Appendix on the following subjects:—No. I. Table, indicating the distribution of Plants within Britain.—No. II. Table, indicating the Geographical Extension of British Plants.—No. III. List of the most generally distributed Plants, as shown by the local Floras.—No. IV. List of Synonyms in "Lindley's Synopsis of the British Flora."—No. V. List of the Natural Orders and included Genera, for the convenience of persons chiefly conversant with the Linnæan Classification.—No. VI. Index to the Genera in Nos. I. and II.

Mr. Watson's "New Botanist's Guide" is a work of immense labour, and ought to be in the hands of every one who studies British Plants. By means of numerous abbreviations, in regard to authorities for the stations, the whole of the rarer plants (omitting the *Cryptogamiæ*) of England and Wales, are comprised in one small closely-printed volume, which the traveller can easily carry in his pocket on his excursions. The arrangement is two-fold—1st, according to counties, as in Turner and Dillwyn's admirable *Botanist's Guide*, (which is indeed the model of the present book,) beginning with Cornwall, and proceeding northerly; while, under each county, the species are arranged according to the Natural Orders; and 2ndly, there is a list of all the species, arranged according to their natural affinities, each of which is followed by an enumeration of the counties in which they are found. The author has derived great assistance in compiling this work from the many local Floras that have been recently published, and still more, perhaps, from the numerous communications he has received, both of specimens and unpublished Catalogues.

(To be continued.)

[1] A work, indeed, only printed for private circulation, but which, from the liberality of Mr. Watson, and his desire to promote the study of this important branch of Botany, is in the possession of almost every one who feels an interest in the subject.

NUMERICAL PROPORTIONS OF THE NATURAL ORDERS OF BRITISH PLANTS AT DIFFERENT ELEVATIONS.

By H. C. Watson, Esq. F.L.S.

In the 3d No. of this Work (p. 86), twelve ascending stages of vegetation, in Britain, were exemplified by the upper lines or limits of trees and shrubs. The following table is intended to exhibit the numerical proportions of phænogamous species, as distributed in similar stages; but the very limited observations hitherto made, with reference to this subject, are altogether inadequate to supply *data* for more than a rude calculation, in which much fewer stages must be taken. A scale of three such stages will suffice to show, in a general way, the change of floral productions seen in passing from the low tracts of England to the Highland Mountains. These three stages may be thus explained:

1. *The Plains* comprehend the whole tract from the south coast of England to the borders of the Scottish Highlands, except the elevated and mountainous portions of Wales, the north-west of England, and south of Scotland. The presence of *Acer campestre, Daphne Laureola, Bryonia dioica*, and *Tamus communis* distinguish the plains from the higher stages. (This stage corresponds to the Region of the Plains in my *Remarks on the Distribution of British Plants*, now in the press.)

2. *The Intermediate* or *Ascending Region* includes the whole tract of country beyond the Grampian Mountains, with the bases, valleys, and acclivities of the hilly tracts elsewhere, excepting such higher portions of the mountains as are referred to the next stage. The presence of *Saxifraga aizoides, S. stellaris, Alchemilla alpina, Oxyria reniformis*, and (probably) also *Arbutus Uva-Ursi* and *Vaccinium uliginosum*, distinguish this stage from the plains; while the genera *Quercus, Corylus, Cytisus, Genista*, and *Ulex* equally separate it from the next. (Corresponds to the Upland and Median Regions of the work above mentioned.)

3. *The Mountains* embrace all the surface rising sufficiently high to produce *Salix herbacea, Azalea procumbens, Gnaphalium supinum, Cerastium alpinum*, or *Saxifraga nivalis*. (Corresponds to the Subalpine and Alpine Regions of the same work.)

The mean annual temperature of these stages may be stated at 52°—46° for the plains; for the ascending region we may estimate it to be 46°—39°; and for the mountains 39°—30°. Ten degrees must be added to give the temperature of summer, and ten degrees subtracted to give that of winter. But, by the paper before referred to, it will be seen that these are merely *estimates*, not *ascertained facts*, in respect to the second and third stages.[1] In comparing the numbers in the table, it is to be kept in mind, that the species found on the plains are well known, which is not the case with those of the mountains; and several may hereafter be found to ascend to this height, which I have not yet ascertained to do so. In addition, the species of some genera, as *Salix, Rosa, Rubus, Myosotis*, &c. being so uncertain, and their distribution so little known, absolute numbers must be very doubtfully stated. About one thousand five hundred and twenty species now appear in our descriptive Floras, of which one thousand four hundred and eighty is the extreme number existing in Britain, properly so called, including England, Wales, and Scotland. The species peculiar to Ireland and the Channel Isles, with others extinct or mistaken, make up the rest. Of these one thousand four hundred and eighty there are found on the plains one thousand three hundred and thirty-two, in the ascending stage seven hundred and thirty, and on the

[1] I may take advantage of this opportunity to remark, that a line of my MSS. appears to have been omitted in setting the types of the paper referred to, and some ambiguity thus introduced. The sentence (2nd column of page 86) should stand thus, the words in italics being those omitted; "the mean temperature of the three coldest months (Dec., Jan., Feb.,) is 10° below that of the *whole year, and the mean of the three warmest months (June, July, Aug.,) as many* degrees above."

mountains (including an estimated number of fifteen *Salices*) two hundred and thirty species.

	Total.	STAGES. 1st.	2nd.	3rd.
Ranunculaceæ, 1 in..	41	42	41	33
Berberideæ	1480	1332	730	...
Nymphæaceæ	493	666	243	...
Papaveraceæ	164	148	146	...
Fumariaceæ	211	190	243	...
Cruciferæ	21	20	20	23
Resedaceæ	370	333	365	...
Cistineæ	370	333	365	...
Violarieæ	185	166	182	77
Droseraceæ	370	333	182	230
Polygaleæ	1480	1332	730	230
Frankeniaceæ	1480	1332	...	...
Caryophylleæ	25	27	25	16
Lineæ	296	266	243	...
Malvaceæ	247	222	243	...
Tiliaceæ	493	444	730	...
Hypericineæ	148	133	122	...
Acerineæ	740	666	730	...
Geraniaceæ	92	83	73	230
Balsamineæ	1480	1332	...	...
Oxalideæ	740	666	730	230
Celastrineæ	493	444	730	...
Rhamneæ	740	666	...	...
Leguminosæ	21	20	26	57
Rosaceæ	21	21	17	18
Onagrarieæ	114	133	81	115
Halorageæ	247	222	182	...
Ceratophylleæ	740	666	...	...
Salicarieæ	493	444	365	...
Tamariscineæ	1480	1332	...	...
Cucurbitaceæ	1480	1332	...	...
Portulaceæ	1480	1332	730	230
Paronychieæ	211	190	730	...
Crassulaceæ	99	89	91	115
Grossularieæ	296	266	182	...
Saxifrageæ	78	190	81	16
Umbelliferæ	23	20	30	...
Araliaceæ	740	666	365	230
Caprifoliaceæ	148	148	104	230
Lorantheæ	1480	1332	...	...
Rubiaceæ	74	70	73	115
Valerianeæ	164	148	182	230
Dipsaceæ	247	222	365	230
Compositæ	11	12	11	13
Lobeliaceæ	740	666	730	...
Campanulaceæ	114	111	243	230
Ericaceæ	71	95	52	15
Oleineæ	740	666	730	...
Apocyneæ	740	666	730	...
Gentianeæ	114	122	91	115
Polemoniaceæ	1480	1332	730	...
Convolvulaceæ	296	266	730	...
Boragineæ	64	61	52	230
Solaneæ	123	111	182	...
Scrophularineæ	32	32	33	23
Labiatæ	27	25	21	77
Verbenaceæ	1480	1332	...	...
Orobancheæ	185	166	730	...
Lentibularieæ	247	266	122	230
Primulaceæ	82	78	73	77
Plumbagineæ	370	333	730	230
Plantagineæ	211	190	122	...
Amaranthaceæ	1480	1332	...	...
Chenopodeæ	62	55	81	...
Polygoneæ	59	61	41	77
Thymeleæ	740	666	...	...
Santalaceæ	1480	1332	...	...
Eleagneæ	1480	1332	...	...
Asarineæ	740	666	...	...
Euphorbiaceæ	92	83	243	...
Urticeæ	296	256	182	230
Ulmaceæ	211	190	365	...
Amentaceæ	17	25	21	14
Coniferæ	493	444	243	115
Empetreæ	1480	1332	730	230
Hydrocharideæ	740	666	...	...
Alismaceæ	247	222	365	...
Juncagineæ	493	444	365	230
Orchideæ	42	42	56	77
Irideæ	211	190	730	...
Amaryllideæ	296	266	...	...
Taneæ	1480	1332	...	...
Smilaceæ	247	266	243	...
Asphodeleæ	86	78	182	...
Tulipaceæ	740	666	...	...
Melanthaceæ	740	1332	730	230
Typhineæ	296	266	182	...
Aroideæ	740	666	730	...
Fluviales	67	61	61	...
Junceæ	57	67	46	21
Restiaceæ	1480	...	730	...
Cyperaceæ	16	18	13	8
Gramineæ	13	12	12	14

SYNOPSIS OF THE GERARDIEÆ, A TRIBE OF SCROPHULARIACEÆ.

By George Bentham, Esq., F.L.S.

THE name of *Gerardia* was originally given by Plumier to a West Indian plant, apparently acanthaceous, which has been referred to *Ruellia rupestris*, Swartz, but Linnæus, in taking up the name, applied it more particularly to three North American plants *G. purpurea, flava*, and *pedicularia*, and one East Indian one *G. delphinifolia*, which have ever since been especially considered as the types of the genus *Gerardia*, although great diversity of opinion has prevailed relating to the character and extent which should be given to it. Indeed Linnæus himself, by combining with these four species Plumier's above-mentioned plant under the name of *G. tuberosa*, the Chinese *G. glutinosa* (which is *Pterostigma grandiflorum*, Benth. Scroph. Ind. p. 21,) and three Cape species, to which I shall presently revert, had not succeeded in establishing a very well defined genus, nor yet a natural one, notwithstanding Lamarck's observation, that it forms "un de ces genres peu saillans par leurs caractères et qui ne sont composés le plus souvent que de l'assemblage d'espèces qu'on aurait pu rapporter à d'autres genres déjà connus, mais qu'on a rapprochées d'après un aspect particulier." The Linnæan character copied by one author after another, as late even as Pursh, is not applicable to any of the above species, except, perhaps, to Plumier's, which nobody has examined since that Botanist, and is as yet a doubtful plant.

The three American species had been increased by the *G. tenuifolia*, Vahl., or *G. erecta*, Walt., when Michaux published his *Flora Boreali-Americana*, in which to these four he added a new one, *G. auriculata*, and associated with them under the name of *G. Afzelia*, the *Afzelia cassioides* of Gmelin.

Pursh, in his *Flora Americæ Septentrionalis*, follows Michaux thus far, changing only the name of *G. Afzelia* to that of *G. cassioides*, and further he takes up Walter's *G. setacea*, and describes three new species, *G. quercifolia, cuneifolia*, and *fruticosa*. To the first, which is allied to, but distinct from, that which he and all subsequent writers consider to be *G. flava*, he adduced as a synonym the *Rhinanthus virginicus* of Gronovius and Linnæus. Upon inspection of the Linnæan Herbarium, it turns out that the *G. quercifolia* is Linnæus's *G. flava*, and it seems probable that the *Rhinanthus virginicus* belongs rather to the *G. flava* of Pursh and modern writers; yet it is perhaps now better, in order to avoid confusion, to apply the names of *G. flava* and *quercifolia*, as they have been done by Pursh, Nuttall, and others, and give Linnæus's *G. flava* as a synonym to *G. quercifolia*.

Of the two other species of Pursh, the one, *G. fruticosa*, is a *Pentstemon*, the other, *G. cuneifolia*, is the *Gratiola acuminata*, Ell. (not of Pursh), or my *Matourea nigrescens*.

In his supplement, Pursh restores Gmelin's genus, under the name of *Seymeria* (*Afzelia* having been previously applied to a Leguminous genus), and adds to the *cassioides*, of which he changes again the specific name for that of *tenuifolia*, another, under the name of *S. pectinata*. The former certainly differs from *Gerardia* in habit, in the form of the calyx and corolla, and in the long beak of the capsule, the second species has an obtuse capsule, but the calyx is the same, and the corolla is also said to be so, and relying on these two characters I should propose adopting the genus as very nearly allied to, but distinct from, *Gerardia*.

Nuttall in his Genera of North American plants, divides the true *Gerardiæ* of that country into two natural groups, the yellow flowered with large cut leaves being my section *Pedicularoides*, and containing the *G. flava, quercifolia*, and *pedicularia*, and the purple-flowered with entire narrow leaves (my *Eugerardia*) comprising the *G. purpurea, tenuifolia* and *setacea*, together with the *G. maritima*, already distinguished from *G. purpurea* by Rafinesque, and three new ones, *G. linifolia, aphylla*,

and *filifolia*, to which he has since added two more, *G. heterophylla* and *longifolia*. He observes also upon the anomaly of Pursh's two above-mentioned species, and suggests that *G. auriculata* may be a *Seymeria*. To me, however, the latter plant does not present any resemblance to *Seymeria*, but a very close one to *G. flava*. However, the purple short corolla, and the two abortive anthers seem to authorise the considering it by itself as a separate section of *Gerardia*, to which I have given the name of *Otophylla*.

Nuttall further adopts Pursh's *Seymeria*, but adds to it, under the name of *S. macrophylla*, a plant which appears to me to have neither the characters nor habit of that genus, but to be closely allied in both respects to *G. pedicularia* and *quercifolia*. Some differences, however, in the anthers, which are not aristate as in the section *Pedicularoides*, and the short curved and oblique corolla, have induced me to include it in a separate section of *Gerardia*, which I have named *Cyrtocodon*.

Elliott, in his Botany of South Carolina and Georgia, added two new species to the section *Eugerardia*, viz. *G. fasciculata* and *Plukenetii*.

Kunth described, from amongst Humboldt and Bonpland's plants, three Mexican species, *G. virgata*, which, with a habit in some measure approaching *Seymeria*, has not its characters, but forms another species of the section *Cyrtocodon*, and *G. prostrata* and *serpyllifolia*, neither of which I have seen, but of which the former, if not both, belong also probably to the same group.

Chamisso and Schlechtendal have published in the Linnæa a new purple-flowered species from Mexico, *G. dasyantha*, which, with the *G. pectinata*, separated by Torrey from the *G. pedicularia*, and four now first described, viz. *G. grandiflora* of the section *Pedicularoides*, *G. densiflora*, of doubtful affinity, and *G. strictifolia* and *peduncularis* of Eugerardia, complete the number of twenty-four North American species now known, all of them confined to that continent.

Sprengel has published as *G. domingensis*, another species from Bertero's West Indian plants. It has fortunately been seen and re-described by Martius, from whose character it appears to be a *Eugerardia*, not far from *G. purpurea*.

Of the South American species the first were described by Chamisso and Schlechtendal in the 3rd volume of the Linnæa from amongst Sello's South Brazilian plants, where these authors establish two sections, *Dargeria*, with exserted stamina, and *Gerardia*, with stamens shorter than the corolla. Martius, in his *Nova Genera et Species, vol.* 3, pointed out the identity of *Dargeria* with *Esterhazya*, previously published by Mikan, but in a work inaccessible to Botanists in general, and at the same time considering the *G. brachyphylla* and *genistifolia* Cham. et Schlecht. to be congeners to *Virgularia* of Ruiz and Pavon, and attaching little importance to the exsertion of the stamina in *Esterhazya*, re-established a genus, *Virgularia*, to consist of these two *Gerardiæ*, of the *Esterhazya splendida*, Mik., and the other *Dargeriæ* of Cham. and Schlecht., and of Ruiz and Pavon's *V. lanceolata* and *revoluta*, and characterized chiefly by a coriaceous capsule with bifid valves and a double dissepiment. The same author published at the same time two new species, *G. angustifolia* and *hispidula*, which, with *G. communis* and *linarioides*, Cham. et Schlecht., he considers as true *Gerardiæ*, with a membranaceous capsule, entire valves, and simple dissepiment. Chamisso and Schlechtendal, reverting to the group in the 8th vol. of the Linnæa, admit the identity of *Dargeria* with *Esterhazya*, but still consider the exsertion of the stamina as a more essential character than the dehiscence of the capsule. And, notwithstanding the great reliance I should generally place on Martius's views, a careful examination of as many species as I have been able to obtain in fruit, induces me to adopt in this instance the arrangement of the editors of the Linnæa. It appears to me impossible to separate *G. linarioides* from *G. genistifolia*, moreover many true *Ge-*

rardiæ have the capsule coriaceous, and some (*G. auriculata, macrophylla*, and sometimes *G. maritima*, and even *G. purpurea*) have the valves more or less bifid, and from Martius's own figure and description it appears that the valves of *Esterhazya montana* are frequently entire. I have therefore retained all Chamisso and Schlechtendal's *Dargeria* in the genus *Esterhazya*, and reduced the other *Virgulariæ* of Martius, together with Ruiz and Pavon's species (for it is evident that *V. revoluta* is but a state of *V. lanceolata* grown in a dry soil) to the *Gerardiæ* of the section *Eugerardia*.

Closely allied to *Esterhazya* is the plant described by Nuttall under the name of *Conradia fuchsioides*, but as the name *Conradia* was previously applied by Martius to a Gesneriaceous genus, I have adopted for Nuttall's plant the MSS. name of *Macranthera*, under which it had been communicated by Dr. Torrey to Dr. Lindley.

All the species of the above-mentioned sections of *Gerardia* are, as far as hitherto known, exclusively American. The East Indian and African ones belong to two distinct sections.

Among the East Indian ones, the *G. delphinifolia* long remained the only one known. Don, in his *Prodromus Floræ Nepalensis* established a genus *Sopubia*, which he distinguished from *Gerardia* by the campanulate corolla, the simple stigmate, and the structure of the anthers, which have one cell large and erect, by which they cohere, and the other small, empty, and divergent. The first character, however, is common to a great many American *Gerardiæ*, and the simple stigma is constant in the whole genus, the structure of the anthers alone is peculiar, and exists also in *G. delphinifolia*, Linn., *G. scabra*, Linn., from the Cape, *G. stricta*, Wall., from the Burmese empire, *G. obtusifolia*, a new Madagascar species, and apparently also in *G. filifolia*, described by Schumacher amongst Thonning's Guinea plants. But as all these species resemble the true *Gerardia* in habit and in all other characters, I have thought it best to consider them as a mere section of that genus. The *Sopubia* of Don had been communicated also by Dr. Wallich, and described in my *Scrophulariæ Indicæ* under the name of *G. scabra*, a name pre-occupied by Linnæus for the above-mentioned Cape species, I have therefore now changed it to *G. Sopubia*.

In describing *G. parvifolia*, another of Dr. Wallich's East Indian species, which has the stamina and capsule of *Eugerardia*, I had referred it to that section, not having observed any peculiarity in the corolla in the ill-dried specimens I had before me. Having now, however, had the opportunity of examining some beautiful specimens in Dr. Hooker's Herbarium, dried at Simla, by Lady Dalhousie, I have ascertained that each lobe of the corolla is bifid, which, together with some difference in habit, will justify the placing it at least in a separate section, to which I have given the name, now unoccupied, of *Dargeria*.

There remain two Linnæan species, the one *G. tubiflora*, is a *Buchnera*, or perhaps a new genus closely allied to it, the other *G. Nigrina*, or *Melasma scabrum* of Berger, is congener and closely allied to *Physocalyx rhinanthoides*, Cham. et Schlecht., from Brazil. These two plants have a different habit from the frutescent species of the latter genus, and the characters appear to me as marked as those which separate any Gerardieous genera. I have therefore adopted for them Berger's name of *Melasma*, which I have taken in preference to *Nigrina*, given to it by Linnæus in his *Mantissa*, in order to avoid confusion with Thunberg's *Nigrina*, a very different plant.

Lyncea of Chamisso and Schlechtendal, from Mexico, is described by those authors as having the same habit as their *Physocalyx rhinanthoides*, and I see nothing in their character to distinguish it generically unless it be that the anthers are obtuse at the base, which appears scarcely sufficient. I should therefore be disposed to consider it as a third species of *Melasma*. *Gastromeria*, Don, has in some respects a similar calyx and corolla, but in other characters,

as far as they are known, as well as in habit, appears to come nearer *Lophospermum*. The specimens, however, in Mr. Lambert's Herbarium from Moçino and Sessé's Mexican collections, are too much eaten up by worms to settle the point.

Of the remaining *Gerardiæ* of different authors, *G. sessilifolia*, Vahl., is a *Glossostylis*, *G. orobanchoides* of Lamarck, who from the above quotations, cannot be supposed to have had any precise notion of the character of this genus, and *G. japonica* of Thunberg, who had perhaps not much idea of any Japanese genus, must remain as puzzles to be cleared up only by the inspection of their herbaria. The former may perhaps be a *Phelipæa*, of the latter I can give no guess. *G. digitata* and *brasiliensis* of Sprengel have already been shown to be, the one a *Convolvulus!* the other a *Franciscea*.

Phtheirospermum of Bunge, from China, is evidently nearly allied to *Gerardia*, and from Fischer and Meyer's description agrees with that genus in every respect, except the "stigma bilobum," in which it differs from the whole tribe.

As many of the above genera and species are described in works either too expensive or too fugitive to be in the hands of the generality of Botanists, I have in the following synopsis, copied the characters of such of them as I have not myself seen.

SCROPHULARIACEARUM Tribus: GERARDIEÆ. *Benth. in Bot. Reg. v.* 21. *Sub. n.* 1770.—*Scroph. Ind. pp.* 12 *et* 48.

Calyx gamosepalus, æstivatione valvata. *Corolla* campanulata infundibuliformis vel tubulosa, limbo 5-fido, laciniis rotundatis planis. *Stamina* 4, adscendentia, omnia sæpissime fertilia. *Antheræ* approximatæ biloculares, loculis discretis parallelis, vel rarissime altero casso divergente. *Stylus* simplex, stigmate integro sæpius elongato lanceolato vel linguæformi. *Capsula* bivalvis, loculicide vel septicide dehiscens, valvulis integris bifidisve. Semina sæpissime testa membranacea laxa arilliformi inclusa.

The plants of this tribe are readily distinguished from *Rhinantheæ* by the upper lobes of the corolla not galeate, from all others by the anthers and stigmate. They nearly all, like the *Rhinantheæ* and many *Veroniceæ*, blacken in drying.

In their geographical distribution the several species are more confined than in most genera, having, as a whole, so wide a geographical range, owing perhaps to the same cause which makes so very beautiful a group so rare in our gardens, the difficulty of preserving the seeds. Of the eight well-known genera of true *Gerardieæ*, the greater proportion are American, but three genera have representatives in tropical and South Africa, and two in East India. No species are common to the Old and New World, nor even to Africa and Asia, or to North and South America; but every genus (unless *Sopubia* be considered as one) has some American species. There are none known in Europe, North Africa, North Asia, Australia, or Polynesia. The genus *Centranthera*, which is somewhat anomalous, extends from East India to North Australia.

CONSPECTUS OF THE GENERA.

* *Calyx 5-dentatus vel 5-fidus, cylindricus vel inflatus.*

1. ESCOBEDIA. *Calyx* cylindricus. *Corollæ* tubus elongatus, limbo amplo 5-fido.

2. PHYSOCALYX. *Calyx* inflatus. *Corolla* infundibuliformis.

3. MELASMA. *Calyx* inflatus. *Corolla* campanulata.

* *Calyx 5-dentatus vel 5-fidus, campanulatus.*

4. ESTERHAZYA. *Calyx* 5-dentatus. *Corolla* tubuloso-infundibuliformis. *Stamina* longe exserta. Frutices.

5. MACRANTHERA. *Calyx* profunde 5-fidus. *Corolla* tubulosa, limbo parvo patente. *Stamina* longe exserta. Herbæ.

6. SEYMERIA. *Calyx* profunde 5-fidus. *Corolla* tubo brevi, limbo subrotato patente. *Stamina* corolla sublongiora.

7. GERARDIA. *Calyx* 5-dentatus vel semi-5-fidus. *Corolla* campanulata vel

tubuloso-campanulata. *Stamina* corolla breviora.

8. GLOSSOSTYLIS. *Corolla* oblique campanulata. *Semina* intra membranam lineari-cuneatam minima.

9? PHTHEIROSPERMUM. *Corolla* campanulata. *Stigma* bilobum.

*** *Calyx compressus hinc fissus.*

10. CENTRANTHERA.

I. ESCOBEDIA. *Ruiz et Pav.*

Calyx longe tubulosus apice 5-fidus, laciniis subpatentibus. *Corolla* infundibuliformis, tubo longo tenui, limbo ample 5-lobo obliquo patente. *Stamina* didynama, tubo inclusa. *Antheræ* omnes fertiles, loculis basi aristatis.—Herbæ *Americanæ, foliis sæpius oppositis.* Pedunculi *axillares uniflori.* Corollæ *albæ.*

1. E. *scabrifolia* (Ruiz et Pav.! Syst. Veg. Fl. Per. et Chil. 158.) foliis ovatis oblongisve basi cordatis dentatis.

Buchnera grandiflora. *Linn.! Suppl.* 287.

Hab. Peru, New Granada. *Humboldt* and *Bonpland.* Eastern declivity of the Cordillera of Peru. *Mathews* (*n.* 2048). Minus geraes, Brazil. *Langsdorff* in Herb. Hook. (*v. s. sp.*)

2. *E. linearis* (Schlecht. Linnæa 8. 246.) foliis longe linearibus.

HAB. Mexico. (*v. s. sp.*)

Calyx two inches and a half long. Corolla, tube four inches long, limb two inches diameter.

II. PHYSOCALYX. *Pohl.*

Calyx inflatus 5-dentatus coloratus. *Corolla* tubuloso - hypocrateriformis, limbo patente subæqualiter 5-lobo. *Stamina* didynama inclusa. *Antheræ* omnes fertiles, loculis basi breviter aristatis.—Frutices *Brasilienses superne dense tecti foliis arrectis crassiusculis integerrimis oppositis alternisve.* Pedunculi *axillares uniflori bibracteati ad apices ramorum racemosi.* Corollæ *rubræ vel sanguineæ.*

1. *P. major* (Mart. Nov. Gen. et Sp. Pl. Bras. 3. 2. t. 201.) foliis ovatis vel ovato-oblongis obtusis mucronulatis, bracteolis infra flores subulato-linearibus, filamentis glabris, antheris dorso barbatis.

HAB. Diamond district. *Martius,* Sierra da Muela. *Sellow.*

2. *P. minor* (Mart. l. c. 3. 4. t. 202.) foliis obovatis acutiusculis, bracteolis infra flores subulato-linearibus, filamentis glabris, antheris dorso barbatis.

HAB. Diamond district. *Martius.*

3. *P. aurantiacus* (Pohl. Pl. Bras. Icon. 1. 65. t. 53.) foliis obovato-ellipticis, bracteolis infra flores oblongo-lanceolatis, filamentis superne antherisque dorso villosis.

HAB. Serro Frio in the Province of Minas. *Pohl.*

The above characters are taken from Martius's above-quoted work. The three species appear to be very nearly allied to each other.

III. MELASMA. *Berg.*

Nigrina *Linn. Mant.*—Gerardiæ sp. *Linn. f. Suppl.*—Physocalycis sp. et Lyncea. *Cham. et Schlecht.*

Calyx laxus, foliaceus, dein inflatus, apice 5-fidus. *Corolla* infundibuliformi-campanulata, limbi lobis brevibus latis. *Stamina* subdidynama corolla breviora. *Antheræ* omnes fertiles, loculis basi apiculatis.—Herbæ *Americanæ vel Capenses, foliis sæpius oppositis;* pedunculis *axillaribus unifloris bracteatis subracemosis.*

1. *M.? hispidum,* piloso-hispidum, foliis lanceolatis subdentatis, basi angustatis, pedunculis apice bracteatis.

Lyncea hispida. *Cham. et. Schlecht. in Linnæa* 5. 108. *et* 8. 24.

HAB. Mexico. *Schiede et Deppe.*

The above character is taken from the descriptions of *Lyncea* in the Linnæa.

2. *M. rhinanthoides,* scaberrimum, foliis oblongis subdentatis basi vix angustatis, pedunculis calyce brevioribus medio bracteatis.

Physocalyx rhinanthoides. *Cham. et Schlecht. in Linnæa,* 8. 23.

HAB. Rio Grande, South Brazil. *Sello, Tweedie.* (*v. s. sp.*)

Flowering calyx about half an inch, corolla nearly an inch long. Calyx in fruit resembling that of a *Physalis.* Capsule obtuse, valves apparently entire.

3. *M. scabrum* (Berg. Fl. Cap. 162. t.

3. f. 4.) foliis lanceolatis basi latioribus dentatis scabris, pedunculis calyce longioribus medio bracteatis.

Nigrina viscosa. *Linn. Mant.* 42.

Gerardia Nigrina. *Linn. Suppl.* 278.

HAB. Cape of Good Hope. (*v. s. sp.*)

Flowers closely resembling those of the preceding species, and of the same size. Teeth of the calyx rather shorter, and corolla rather fuller.

IV. ESTERHAZYA. *Mikan.*

Calyx campanulatus 5-dentatus. *Corolla* tubuloso-infundibuliformis, limbi lobis ovato-rotundatis subæqualibus. *Stamina* didynama, exserta. *Antheræ* omnes fertiles, loculis basi acutis villosissimis.—Frutices *Brasilienses ramosissimi, basi denudati, foliis sæpius oppositis integerrimis carnosulis;* flores *breviter racemosi versus apices ramorum pedunculati, pedunculis bracteatis.*

1. *E. campestris* (Spix et Mart. Reise in Bras. 1. 397.) foliis lanceolatis vel oblongo-lanceolatis mucronulatis basi contractis uninerviis, floralibus pedunculos superantibus, racemis subsimplicibus. (Mart.)

Virgularia campestris. *Mart. Nov. Gen. et Sp. Pl. Bras.* 3. 7. *t.* 203.

HAB. Diamond district. *Martius.*

2. *E. montana* (Spix et Mart. l. c.) foliis linearibus utrinque acutis uninerviis fasciculatis, floribus calyces superantibus, racemis compositis. (Mart.)

Virgularia montana. *Mart. l. c.* 3. 9. *t.* 204.

Gerardia cæsarea. *Cham. et Schlecht. Linnæa,* 3. 17.

HAB. Province of Minas, *Martius.* Tropical Brasil, *Sello.*

3. *E. splendida* (Mikan Del. Pl. et Faun. Bras. t. 5.) foliis anguste lanceolatis acutis in petiolum angustatis, racemo subsimplici paucifloro folioso. (Cham. et Schlecht.)

Virgularia splendida, *Mart. l. c.* 3. 11.

Gerardia gnidioides, *Cham. et Schlecht. Linnæa,* 3. 16.

HAB. Tropical Brasil, *Sello.* Bahia, *Martius.*

According to Chamisso and Schlechtendal, the above three species run so much into one another, that they may perhaps be but varieties of each other.

4. *E. macrodonta* (Cham. et Schlecht. Linnæa, 8. 26.) foliis lanceolatis basi angustatis apice acutis mucronatis, panicula terminali pyramidata comosa, ramulis bifloris, pedunculis folia ramulosque superantibus, dentibus calycinis subulato-acuminatis. (Cham. et Schlecht.)

HAB. Brasil, *Sellow.*

V. MACRANTHERA. *Torrey.*

Conradia, *Nutt. non Mart.*

Calyx campanulatus, laciniis 5 linearibus tubo longioribus. *Corolla* tubulosa, limbi laciniis 5 brevibus subæqualibus patentibus. *Stamina* subæqualia, exserta. *Antheræ* erectæ, omnes biloculares fertiles. *Stigma* tenue. *Capsula* subglobosa, acuta. —Herba *Americana erecta.* Folia *dissecta, Flores racemosi.*

1. *M. fuchsioides.*

Conradia fuchsioides, *Nutt.! Journ. Acad. Nat. Sc. Philad.* 7. 88. *t.* 12.

HAB. Southern States of North America. Louisiana. *Drummond.* (*v. s. sp.*)

Plant two or three feet high, slightly pubescent. Segments of the leaves lanceolate, those of the lower ones divided. Raceme long unilateral. Peduncles opposite, patent, or slightly reflexed. Flowers erect. Corolla an inch long, slightly incurved at the top, mouth oblique. Stamens pubescent.

VI. SEYMERIA. *Pursh.*

Afzelia, *Gmel. non Sm.*

Calyx campanulatus, laciniis 5 linearibus tubo longioribus. *Corolla* tubo brevi, laciniis 5 oblongis demum subrotato-patentibus. *Stamina* subæqualia, corolla sublongiora. *Antheræ* erectæ, omnes biloculare, fertiles. *Stigma* tenue. *Capsula* basi globosa, apice compressa. Herbæ *Boreali-Americanæ, foliis pinnatisectis, segmentis linearibus filiformibusve.* Flores *parvi subpaniculato-racemosi.* Corolla *lutea.*

1. *E. tenuifolia* (Pursh! Fl. Amer. Sept. 2. 737.), tenuissime viscido-pubescens, foliis setaceo-pinnatifidis, laciniis incisis, capsulis glabris rostratis.

Afzelia cassioides, *Gmel. Syst. Nat.* 927.

Gerardia Afzelia, *Mich. Fl. Bor. Amer.* 2. 20.

Gerardia cassioides, *Pers. Syn.* 2. 154.

Hab. Carolina, Georgia, Louisiania, &c. (*v. s. sp.*)

Branches slender. Leaves small, distant. Flowers about half an inch diameter. Capsule the size of a grain of pepper, with a pointed beak as long as the capsule itself.

2. *S. pectinata* (Pursh. Fl. Amer. Sept. 2. 737.) pubescens, foliis pinnatifidis laciniis linearibus obtusis subincisis, capsulis pubescentibus obtusis.

Hab. South Carolina, *Pursh.* Louisiania, *Drummond. (v. s. sp.)*

Leaves large, and their lobes much broader than in the last. Capsules larger, compressed but obtuse, and almost emarginate at the top. I have not seen the corolla.

VII. Gerardia. *Linn.*

Virgularia, *Ruiz et Pav.*—Sopubia, *Don.*

Calyx campanulatus 5-dentatus vel 5-fidus. *Corolla* campanulata vel ventricoso-tubuloso-campanulata, limbo 5-fido laciniis rotundatis semipatentibus. *Stamina* didynama vel rarius subæqualia corolla breviora. *Antheræ* nunc omnes loculis 2 fertilibus, nunc loculo altero fertili, altero casso, nunc antheræ 2 fertilis, 2 minores steriles. *Capsula* acuta vel obtusa erostrata. Herbæ *suffruticesve Americanæ, Capenses vel Indicæ.* Flores *solitarii axillares, sessiles vel pedunculati, pedunculis sæpius ebracteatis.* Corolla *flava vel roseo-purpurea.*

Conspectus specierum.

Sect. I. Cyrtocodon. Flores flavi. Antheræ muticæ omnes fertiles.

1—4. G. serpyllifolia ?, prostrata, virgata, macrophylla.

Sect. II. Otophylla. Flores purpurei. Antheræ muticæ 2 fertiles, 2 minores cassæ.

5. G. auricularia.

Sect. III. Pedicularoides. Flores flavi. Antheræ basi aristatæ, omnes fertiles.

6—10. G. flava, quercifolia, grandiflora; pedicularia, pectinata.

Species incertæ sedis.

11. S. densiflora.

Sect. IV. Eugerardia. Flores purpurei. Antheræ acutæ omnes æqualiter biloculares fertiles. Corollæ laciniæ integræ.

* *Corolla ample campanulata vel tubuloso-campanulata villosa. Herbæ suffruticesve. Austro-Americanæ.*

12—17. G. digitalis, rigida, brachyphylla, lanceolata, linarioides, geniistifolia.

** *Corolla subtubulosa fere glabra. Herbæ Austro-Americanæ.*

18—20. G. angustifolia, hispidula, communis.

*** *Corolla subcampanulata glabra vel leviter pubescens. Herbæ Boreali-Americanæ.*

* *Pedunculi calyce breviores, dentes calycini elongati.*

21—22. G. dasyantha, heterophylla.

b. *Pedunculi calyce breviores, dentes calycis truncati breves.*

23—27. G. fasciculata, domingensis, maritima, Plukenetii, purpurea.

c. *Pedunculi calyce longiores.*

28—35. G. longifolia, linifolia, peduncularis, filifolia, strictifolia, tenuifolia, setacea, aphylla.

Sect. V. Dargeria. Corollæ lobi bifidi. Antheræ omnes fertiles.

36. G. parviflora.

Sect. VI. Sopubia. Corollæ lobi integri. Antherarum loculus alter fertilis alter cassus divergens.

37—42. G. Sopubia, stricta, delphinifolia scabra, obtusifolia, filiformis.

Sectio I. Cyrtocodon.

Calyx profunde 5-fidus. Corolla flava tubo sæpius brevi incurvo. Antheræ muticæ omnes loculis 2 fertilibus. Species omnes Boreali-Americanæ.

1 ? *G. serpyllifolia* (Humb. et Kunth, Nov. Gen. et Sp. Amer. 2. 343.) procumbens, foliis ovatis obtusis integerrimis, floribus axillaribus solitariis sessilibus, laciniis calycinis integerrimis (Kunth).

Hab. New Spain. *Humboldt* and *Bonpland.*

An under shrub. Leaves about two lines

long. Corolla glabrous, pale yellow, almost funnel-shaped, tube three times as long as the calyx. Stamina and ovarium entirely glabrous (Kunth).

2? *G. prostrata* (Humb. et Kunth l. c.) prostrata, foliis pinnatifidis laciniis linearibus acuto-mucronatis, inferioribus incisis, floribus axillaribus solitariis sessilibus, laciniis calycinis pinnatifidis incisis (Kunth).

Hab. New Spain. *Humboldt* and *Bonpland.*

Stems cespitose, two to three inches long. Leaves three to four lines long. Flowers an inch and a half.

I have not seen the above two species, they differ from the two following in the length of the tube of the corolla. Perhaps they should form a separate section.

3. *G. virgata* (Humb. et Kunth, l. c. 2. 344.), erecta, pubescens, foliis pinnatifidis, laciniis linearibus obtusis integris incisisve, laciniis calycinis oblongis integris dentatisque, corollæ tubo decurvo, staminibus subæqualibus, antheris erectis glabris, capsula ovata acuta.

Hab. Mexico. (*v. s. sp.*)

Flowers yellow. Tube of the corolla rather longer than in *G. macrophylla*, and more incurved. Filaments very woolly.

There were specimens of this plant amongst Forbes's Madagascar plants, in the Horticultural Society's herbarium, but I cannot but suspect they must have got there by accident, from some other collection.

4. *G. macrophylla*, pubescens, foliis inciso-dentatis pinnatifidis vel infimis bipinnatifidis, laciniis ovato- vel oblongo-lanceolatis, supremis subintegerrimis, floribus subsessilibus, calycibus hirsutis laciniis ovatis subdentatis, corollæ tubo brevi incurvo intus villoso, staminibus didynamis, antheris pilosiusculis (?)

Seymeria macrophylla. *Nutt. Gen. Pl. Amer.* 2. 49.

Hab. United States; Ohio, *Nuttall.* Kentucky, *Dr. Peters.* (*v. l. sp.*)

The form and colour of the corolla, the blunt anthers, &c. connect this species with the preceding. Nuttall describes also the anthers as glabrous, in my specimens they appear to be slightly hairy, but they are so very much pressed in drying, that it is difficult to separate them from the hairs of the corolla. The habit of the plant is nearer that of *G. grandiflora.* A slight inequality in the size of the anthers of the upper and lower pair, shows an approach to the sterile lower anthers of *G. auriculata.* I have not seen the capsule, but it is described by Nuttall, as small, ventricose, with a compressed point, and somewhat four-valved.

Sectio II. Otophylla.

Calyx profunde 5-fidus. Corolla purpurea, campanulata. Stamina didynama antheris longiorum fertilibus, breviorum minoribus cassis.

5. *G. auriculata* (Michx. Fl. Bor. Amer. 2. 48.) Herba erecta, foliis oblongo-lanceolatis basi sæpius auriculato-lobatis, floribus subsessilibus.

Seymeria auriculata. *Spreng. Syst.* 2. 810.

Hab. United States of North America, chiefly the Western ones. (*v. s. sp.*)

Sectio III. Pedicularoides.

Calyx semi-5-fidus. Corolla flava tubuloso-campanulata. Stamina didynama. Antheræ subæquales, loculis binis fertilibus basi calcaratis. — Herbæ Boreali-Americanæ, foliis latiusculis sæpius incisis.—Corollæ lobi sæpissime ciliati.

6. *G. flava* (Pursh! et Auct. an Linn.) pubescens, foliis ovato-lanceolatis oblongisve obtusis integerrimis vel sinuato-lobatis, calycis pubescentis laciniis oblongis obtusis tubo subbrevioribus.

Hab. United States, common. (*v. s. sp.*)

Corolla about an inch and a half long, glabrous.—Linnæus's character of *G. flava* as well as the specimen in his herbarium belong to *G. quercifolia.* The figure quoted of Plukenet, t. 389. f. 1. is apparently *G. flava,* as to the other figure, t. 368, there is some error, as there is nothing of the kind in that plate. It is probable that Linnæus included both species under *G. flava.*

7. *G. quercifolia* (Pursh! Fl. Amer. Sept.

2, 423.) glaberrima, foliis inferioribus amplis bipinnatifidis superioribus oblongolanceolatis pinnatifidis integerrimisve, calycis subinflati laciniis lanceolatis acutis tubo brevioribus.

G. flava. *Linn. Spec.* 848. *ex parte, non Pursh.*

HAB. United States, common. (*v. s. sp.*)

Corolla rather larger than that of the preceding species. Calyx larger. The characters derived from the form of the calyx, and the want of pubescense are constant. The leaves vary much, but are always more divided than in *G. flava.*

8. *G. grandiflora*, pubescens, foliis ovato-lanceolatis acutis apice serratis basi pinnatifidis, calycibus pedicello longioribus, laciniis obtusis integerrimis dentatisve, corollis calyce quadruplo longioribus.

HAB. Province of Texas, *Drummond.* (*v. s. sp.*)

Corolla full twenty lines long. Capsule coriaceous, large, pointed. Intermediate, as it were, between *G. pedicularia* and *quercifolia.*

9. *G. pedicularia* (Linn.! Spec. 849.) glabriuscula vel pubescens, foliis ovato-lanceolatis obtusis pinnatifidis, laciniis dentatis, calycibus pedicello brevioribus laciniis dentatis, corollis calyce triplo longioribus.

HAB. United States, common. (*v. s. sp.*)

Corolla fifteen lines long. Capsule coriaceous pointed.

10. *G. pectinata* (Torrey! MSS. ?) hirsuta, foliis pectinato-pinnatifidis, lobis subdentatis, calycibus brevissime pedicellatis hirsutissimis profunde 5-fidis, laciniis dentatis, corollis calyce triplo longioribus.— *G. pedicularia, β.* pectinata. *Nutt. Gen. Pl. N. Amer.* 2. 48.

HAB. Carolina and Georgia, *Nuttall.* Rocky Mountains, *Torrey.* (*v. s. sp.*)

Corolla as in *G. pedicularia*, from which it differs in being more hairy, the leaves usually smaller and more divided, and the peduncles much shorter.

11. *G. densiflora*, scabro-hispida, foliis pinnatifidis laciniis anguste linearibus acutis rigidis ciliato-scabris, floribus secundis spicatis, laciniis calycinis lanceolatis acutissimis, corollæ tubo basi attenuato apice dilatato, capsulis obtusis.

HAB. Texas, *Drummond.* (*v. s. sp.*)

A remarkable species, in some respects connected with *Pedicularoides*, in others with *Eugerardia.* Colour of the flowers unknown. Corolla an inch long. Filaments hairy. Anthers of the section *Eugerardia*, but more pointed : at the base they are slightly pilose.

SECTIO IV. EUGERARDIA.

Calyx 5-dentatus rarius semi-5-fidus. Corolla purpurea campanulata vel tubuloso campanulata rarius ventricoso-tubulosa. Antheræ subæquales loculis binis fertilibus muticis. Herbæ suffruticesve Austro et Boreali-Americanæ, foliis linearibus rarius lanceolatis integerrimis vel infimis rarissime incisis.

12. *G. digitalis*, glabra, foliis linearibus læviusculis, floribus subsessilibus, dentibus calycinis brevibus truncatis muticis margine villosissimis, corollis ample campanulatis villosis calyce 4—5-plo longioribus.

HAB. Maldonado, South America, *Tweedie.* (*v. s. sp.*)

Flowers in terminal interrupted spikes, the floral leaves very small. Calyx of *G. Sopubia.* Corolla above an inch long, very open. Probably a low shrub.

13. *G. rigida* (Gill. MSS.) glabra, scabra, foliis linearibus acutissimis, floribus racemoso - spicatis, calycibus pedunculo longioribus truncatis, dentibus brevibus acutis, corollis ample tubuloso-campanulatis villosis calyce 4—5-plo longioribus.

HAB. Province of San Louis, South America, *Gillies.* (*v. s. sp.*)

Flowers the same size, but more hairy than in *G. linarioides.*

14. *G. brachyphylla* (Cham. et Schlecht. Linnæa, 3. 15.) fruticosa, glabra, lævis, foliis parvis anguste lanceolatis mucronulatis, floribus pedunculatis, dentibus calycinis brevibus acutis capsula ovoidea brevioribus. (Cham et Schlecht.)

Esterhazya alpestris, *Spix. und. Mart. Reise in Bras.* 1. 397.

Virgularia alpestris, *Mart. Nov. Gen. et Sp. Bras.* 3. 10. *t.* 205.

HAB. Tropical Brazil, *Sello.*

Leaves somewhat fleshy, four lines long. Peduncles shorter than the leaf. Corolla like *G. linarioides*, but rather smaller. Filaments with a few hairs at the base. Anthers glabrous (hairy, *Mart.*). Capsular valves at length split. (Cham. et Schlecht.)

15. *G. lanceolata*, glabra, lævis, foliis oblongo-linearibus mucronatis basi angustatis, floribus breviter pedunculatis, dentibus calycinis brevibus acutis, corollis ample tubuloso-campanulatis villosis calyce 4-plo longioribus.

Virgularia lanceolata, *Ruiz et Pav.! Syst. Veg. Fl. Per.* 161.

V. revoluta, *Ruiz et Pav.! l. c.*

HAB. Peru, between Huariaca and Huanuco, *Mathews.* (*n.* 903.) (*v. s. sp.*)

Closely allied to the preceding, of which it may be a variety. It differs chiefly in the leaves being rather broader, especially near the apex and longer. The anthers and filaments are perfectly glabrous.

16. *G. linarioides* (Cham. et Schlecht. in Linnæa 3. 13.) glabra, scabriuscula, foliis linearibus acutis uninerviis, floribus racemosis, calycibus pedunculo brevioribus dentibus ovato-truncatis lanceolatisve acutis tubo multo brevioribus, corollis ample tubuloso-campanulatis pubescentibus calyce 4—5-plo longioribus.

HAB. Banda Oriental, South America, *Tweedie.* (*v. s. sp.*)

Differs from the following, chiefly by its narrower leaves.

17. *G. genistifolia* (Cham. et Schlecht. Linnæa 3. 15.) glabra, scabriuscula, foliis lanceolatis acutis subtrinerviis, floribus racemosis, calycibus pedunculo brevioribus dentibus ovato-truncatis lanceolatisve acutis tubo multo brevioribus, corollis ample tubuloso-campanulatis pubescentibus calyce 4—5-plo longioribus.

HAB. Banda Oriental, South America, *Tweedie.* (*v. s. sp.*)

Herbaceous, perennial, erect. Corolla nearly an inch and a half long.

18. *G. angustifolia* (Mart. Nov. Gen. et Sp. Bras. 3. 12. t. 206.) perennis, glaberrima, caule erecto virgato-ramoso, foliis ultrapollicaribus angusto-linearibus acutis erecto-patulis, pedunculis ebracteatis folia subæquantibus, calycis æqualis dentibus mucronulatis, corollis calyces 5-plo superantibus (Martius).

HAB. Province of Minas, Brazil, *Martius.*

It appears to have the habit of *G. peduncularis*, but with a tubular corolla a little dilated at the top, and about an inch long.

19. *G. hispidula* (Mart. l. c. 3. 13. t. 207.) annua patenti-hispida, caule fastigiato-ramoso, foliis ultrapollicaribus linearibus acutis patulis præsertim margine papillosis, pedunculis bibracteatis folia superantibus, calycis æqualis dentibus acutis, corollis calyce triplo longioribus (Martius).

HAB. Provinces of Piauhia and Para, Brazil, *Martius.*

Differs from the whole genus by the bracteate peduncles. Corolla of the same form as in the preceding species, but about half the size.

20. *G. communis* (Cham. et Schlecht. Linnæa, 3. 12.) glabra, lævis, floribus subsessilibus, dentibus calycinis tubo longioribus, corolla tubuloso-campanulata dentes calycinos breviter excedente.

HAB. Common in South Brazil, from Rio Janeiro to the Banda Oriental. (*v. s. sp.*)

Corolla half an inch long, slightly pubescent. Filaments and anthers slightly hairy. Capsule truncate or emarginate, furrowed at the insertion of the dissepiments, but the valves are entire.

21. *G. dasyantha* (Schiede et Deppe, Linnæa 5. 104.) caule bifariam pubescente, foliis linearibus glabris, dentibus calycinis tubo longioribus, corollis extus pubescentibus calyce subduplo longioribus. (Char. ex descr. Cham. et Schlecht.)

HAB. In the Tierra fria of Mexico, *Schiede and Deppe.*

Said to resemble *G. purpurea* in appearance.

22. *G. heterophylla* (Nutt.! Trans. Amer. Phil. Soc. 5. 180.) glabra, foliis radicalibus latis incisis, caulinis linearibus vel lineari-lanceolatis acutis rigidis margine scabris, floribus subsessilibus, calycibus angulatis,

dentibus lanceolato-linearibus acutissimis tubo parum brevioribus, corollis ample campanulatis extus tomentoso-pubescentibus calyce 3—4-plo longioribus.

β. grandiflora.

HAB. Arkansas, *Nuttall.* Texas, *Drummond.* (2d Coll. n. 204 and 206 bis. 3rd Coll. n. 295.) (*v. s. sp.*)

Corolla very open, from eight lines to an inch long. The lower leaves are described as trifid or laciniate, both by Drummond and Nuttall, but none of the specimens I have seen have them.

23. *G. fasciculata* (Elliott Bot. of S. Carol. and Georg. 2. 115.) scaberrima, caule rigido superne ramoso, foliis anguste linearibus acutis, pedunculis brevissimis, calycibus truncatis dentibus brevibus acutis, corollis amplis campanulatis leviter pubescentibus calyce 5-plo longioribus.

HAB. Jacksonville, *Drummond.* S. Carolina and Georgia, *Elliott.* (*v. s. sp.*)

Corolla ten to eleven lines long. Branches stiffly brachiate. Calyx of *G. purpurea*, but teeth rather shorter in Drummond's specimens, and in the Carolina ones rather longer as described by Elliott. The young leaves are frequently, but not constantly fascicled in the axilla of the stem leaves. I have therefore little doubt of this being Elliott's plant, although I have not seen authentic specimens. It may be however a mere variety of *G. purpurea*, differing chiefly in its narrow leaves often fasciculate, rigid habit, and remarkably scabrous stem and leaves.

24. *G. Domingensis* (Spreng. Syst. 2. 817.) perennis, tenuissime hispidula, caule stricto erecto subfastigiato-ramoso, foliis subpollicaribus angusto-linearibus acutis erectiusculis, quam pedunculi breves ebracteati triplo longioribus, dentibus calycis æqualis acutis, corollis calyces triplo superantibus. (Mart.)

HAB. St. Domingo, *Bertero.*

Appears to be allied to *G. purpurea* and to *G. fasciculata*, but the flowers are described as being but four lines long.

25. *G. maritima* (Rafin. N. York Med. Rep. 2. 361.) humilis, glabra, carnosa, foliis linearibus obtusis, racemo terminali, calycibus breviter pedunculatis truncatis dentibus brevissimis obtusis muticis, corollis glabris campanulatis calyce 3—4-plo longioribus.

G. crinita, *Eddy.*

G. purpurea *β.* crassifolia, *Pursh, Fl. Amer. Sept.* 2. 422.

β. grandiflora.

HAB. Salt marshes in New Jersey and New York. *β.* Texas, *Drummond.* (1st Coll.) (*v. s. sp.*)

In the ordinary state of this plant, in New Jersey, it is but three or four inches high, and the corolla scarcely eight lines long. In the var. *β.* it is near twice as high, with few leaves in the upper part, and the corolla is about eight lines long.

26. *G. Plukenetii* (Ell. Bot. of S. Car. and Georg. 2, 114.) lævissima, foliis parvis remotis filiformibus subfasciculatis, pedunculis calyce foliisque brevioribus, calycibus truncatis dentibus brevibus acutis, corollis tenuissime pubescentibus calyce vix triplo longioribus.

HAB. Carolina and Georgia, *Elliott.* Cherokee Country, *Herb. Banks.* (*v. s. sp.*)

Comes near the var. *γ.* of *G. tenuifolia*, but the leaves are still more slender, and the peduncles constantly very short.

27. *G. purpurea* (Linn. Spec. 848.) foliis linearibus acutiusculis planis margine scabris, floribus breviter pedunculatis, calycibus subenerviis dentibus acutis tubo dimidio brevioribus, corollis glabris ample campanulatis, basi breviter tubulosis.

α. parviflora, corolla vix 7—8-lineari.

β. grandiflora, corolla pollicari.

HAB. United States, common. *α.* Boston. *β.* New Jersey. (*v. s. sp.*)

The two varieties, at first sight, appear different, but I can find no character but the size of the corolla, which varies in several other species of *Gerardia.*

28. *G. longifolia* (Nutt. Trans. Amer. Phil. Soc. 5. 180.), foliis anguste linearibus margine scabris, floralibus flores superantibus, pedunculis calyce multo longioribus, calycibus subenerviis dentibus lanceolatis acutis tubo vix brevioribus, corollis glabris ample campanulatis basi breviter tubulosis.

Hab. Arkansa, *Nuttall.* Red River in the North West, *Douglas.* (*v. s. sp.*)

Corolla of *G. purpurea*, β. which it resembles in many respects. Although coming from a very different latitude, Douglas's specimens answer perfectly to Nuttall's description.

29. *G. linifolia* (Nutt. Gen. Pl. N. Amer. 2. 47.), caule virgato lævi ramosissimo, ramis apice floriferis, foliis linearibus acutis lævibus vel scabriusculis pedunculo longioribus, calycibus truncatis campanulatis minute dentatis, corollis amplis campanulatis fauce pubescente laciniis omnibus ciliatis.

Hab. N. Carolina to Florida, *Nuttall.* Alabama, *Dr. Gates.* (*v. s. sp.*)

Stems two to three feet high. Calyx remarkably truncate, yet presenting five minute and acute dentures nearly on a line with the margin. Leaves smooth according to Nuttall: in Dr. Gates's specimens, in Dr. Hooker's Herbarium, they are, on the contrary, rough at the margin; yet I am persuaded they belong to Nuttall's species, which differs from *G. filifolia* chiefly by the shortness of the peduncle.

30. *G. pedunculari*s, foliis linearibus margine revolutis cauleque scaberrimis, racemis paniculatis, calycibus longe pedunculatis angulatis truncatis dentibus brevibus acutis, corollis ample campanulatis pubescentibus margine longe ciliatis calyce 4-plo longioribus.

Hab. Mexico, *Tate.* (*v. s. sp.*)

Differs from *G. purpurea* chiefly by its narrow leaves, long peduncles, short teeth of the calyx, and somewhat larger corolla. Peduncles rigid, two inches long. Capsule globose, longer than the calyx.

31. *G. filifolia* (Nutt. l. c. 2. 48.) foliis filiformibus plerisque alternis subfasciculatis cauleque scabris (lævibusve ?), racemis paniculatis, pedunculis floriferis folio multo longioribus, calyce truncato dentibus, brevibus acutis, corolla ampla ventricoso-campanulata.

Hab. West Florida, *Nuttall.* Jacksonville, Louisiana, and Texas (3rd Coll. n. 217.) *Drummond.* (*v. s. sp.*)

The plants before me differ again from Nuttall's description in the roughness of the leaves, but that author had evidently only a single imperfect specimen. The species is intermediate between *G. pedunculari*s and *G. tenuifolia*, γ., distinguished from the former by the slender stems and filiform leaves, often but not always fascicled, from the latter by the large flowers, long peduncles, &c.

32. *G. strictifolia*, foliis linearibus rigidis acutissimis cauleque ramosissimo scabriusculis, racemis subpaniculatis, pedunculis folio longioribus, calycibus truncatis dentibus setaceis, corollis campanulatis calyce sub 4-plo longioribus.

Hab. Texas, *Drummond* (3rd Coll. n. 294.). (*v. s. sp.*)

This plant has sometimes almost the foliage and aspect of *G. heterophylla*, with the corolla of *G. tenuifolia* but larger, the peduncles are nearly as long as in *G. filifolia.* The anthers are very woolly as in *G. tenuifolia.*

33. *G. tenuifolia* (Vahl, Symb. 3. 79.) caule angulato læviusculo, foliis linearibus supra plus-minusve scabro-pilosulis, racemis paniculatis, pedunculis folio demum sublongioribus, calycibus truncatis dentibus brevissimis acutis, corollis campanulatis glabriusculis calyce sub 3-plo longioribus, capsula subglobosa calycem non excedente.

G. erecta, *Walt. Fl. Car.* 170. *sec. Pursh.*

α. *humilis*, læviuscula, foliis maximis vix ultrapollicaribus latiusculis, corolla 5—6 lineari.

β. *macrophylla*, scabrior, foliis maximis 2—3-pollicaribus latiusculis, corolla 7—8 lineari.

γ. *leptophylla*, scabriuscula, elata, foliis filiformibus maximis vix pollicaribus, corolla 6—7-lineari.

Hab. United States, common, α. Boston. β. Jacksonville and St. Louis, *Drummond.* γ. Jacksonville and Louisiana, *Drummond.* (*v. s. sp.*)

The above varieties may, perhaps, be species, especially the last, but the characters are very slight. They all differ from *G. pedunculari*s by the glabrous, scarcely ciliate corolla; from *G. setacea*, by the short capsule and habit; from *G. longifolia*

by the truncate calyx with minute teeth. They have all the same slender, very branchy habit, the stems always marked with decurrent lines from the base of the leaves, the anthers with long white woolly hairs.

34. *G. setacea* (Walt. Fl. Car. 170 sec. Pursh et Nutt.) ramis gracilibus, foliisque setaceis scabriusculis, floribus paucis longe pedunculatis, calycis dentibus brevibus setaceis, capsula ovata calyce longiore.

β. parvifolia, foliis distantibus 3—6 lin. longis, floribus racemosis.

HAB. Pennsylvania to Carolina, St. Louis, *Drummond*. *β*. Jacksonville. (*v. s. sp.*)

A species allied to *G. tenuifolia*, but certainly distinct. The variety *β*. has some resemblance to *G. aphylla*, but the leaves are never reduced to mere squamæ. The capsule, in both varieties, is longer in proportion to the calyx, than in either *G. tenuifolia* or *G. aphylla*, between which species this one forms the connecting link. It does not dry so black as any others of the genus.

35. *G. aphylla* (Nutt. Gen. Pl. N. Amer. 2. 47.) ramis elongatis filiformibus subnudis scabris, foliis brevibus remotis linearibus vel omnibus minutis squamæformibus, calycibus pedunculatis truncatis dentibus brevissimis acutis, capsula globosa calycem excedente.

β. filicaulis, ramis gracillimis paucifloris floribus parvis.

γ. grandiflora, ramis rigidis, floribus racemosis majusculis.

HAB. North Carolina to Florida, *Nuttall*. Jacksonville, *Drummond*. (*v. s. sp.*)

In the variety *β*. the flowers are rather smaller, in *γ*. rather larger than in the common varieties of *G. tenuifolia*. The *G. aphylla* appears to be a variable plant, but readily known by the greater number of the leaves being reduced to obtuse or mucronate squamæ scarcely a line long. Very rarely, the lower leaves attain the length of four or five lines, in which case they are remarkably rigid and sharp.

SECTIO V. DARGERIA.

Calyx 5-dentatus. Corolla purpurea, laciniis emarginato-bifidis. Stamina didynama, antheris omnibus æqualiter bilocularibus fertilibus. Herba Indica, foliis pinnatisectis laciniis linearibus.

36. *G. parviflora* (Benth. in Wall. Cat. n. 3888.—Scroph. Ind. 48.) Caulis elatus, acute tetragonus. Racemi numerosi, virgati, in paniculam amplam dispositi. Flores breviter pedicellati. Corolla vix 2 lin. longa. Capsula ovoideo-globosa retusa parum compressa, valvulis maturitate recurvis integris.

HAB. Himalaya Mountains. (*v. s. sp.*)

SECTIO VI. SOPUBIA.

Calyx campanulatus 5-dentatus. Corollæ laciniæ integræ. Stamina didynama, antherarum omnium loculo altero fertili erecto altero minore divergente casso. Capsulæ valvulæ sæpius bifidæ, dissepimento apice tantum vel fere ad basin dehiscentia soluto. Herbæ Austro-Africanæ vel Indicæ, foliis angustis plerumque incisis, inflorescentiæ Eugerardearum, *corollis purpureis flavisve.*

37. *G. Sopubia*, rigida, ramosa, foliis pinnatisectis, laciniis linearibus scabris, dentibus calycinis ovatis margine ciliato-membranaceis tubo multo brevioribus.

G. scabra, *Wall. Cat. n.* 3889.—*Benth. Scroph. Ind.* 49, *non Linn.*

Sopubia trifida, *Hamilt. in Don Prod. Fl. Nep.* 88.

HAB. Himalaya range, common, also in Ceylon, *Macrae*, and Madagascar, *Lyall*. (*v. s. sp.*)

Flowers yellow? The Madagascar specimens have rather larger, or, perhaps, only better dried flowers than the East Indian ones, but are not otherwise distinct. Amongst them is an imperfect one, with entire and nearly smooth leaves, and apparently longer peduncles to the flowers, but it is impossible to say whether these differences may not be accidental.

38. *G. stricta* (Benth. in Wall. Cat. n. 3887.—Scroph. Ind. 49.), aspera, rigida, subramosa, foliis lanceolato-linearibus hinc inde dentatis incisisve, dentibus, calycinis lanceolatis acutis nudis tubo multo brevioribus.

HAB. Martaban and Prome, *Wallich*. (*v. s. sp.*)

Flowers of *G. delphinifolia.* Capsule globose at the base, compressed at the top.

39. *G. delphinifolia* (Linn.! Spec. 848.) ramosissima, lævis, foliis pinnatifidis, laciniis angusto-linearibus, dentibus calycinis lineari-subulatis tubo longioribus. TAB. XI.

G. delphinifolia, *Roxb. Pl. Corom.* 1. *t.* 90.

Euphrasia Coromandeliana, *Rottl. in Spr. Syst. Veg.* 2. 775.

β. parviflora.—G. Heyneana, *Benth. in Wall. Cat. n.* 3891.

HAB. India, chiefly in the Peninsula, and as far North as Lohargan, *Royle.* "Always in wet soil, sometimes even in water. I have met with it at a considerable elevation above the sea, I think nearly one thousand feet. The specimen here figured was gathered within three or four feet above that level." Flowers and ripens its fruit during the cool season." *Wight MSS.* (*v. s. sp.*)

"Stems herbaceous, erect, ramous, four-sided, smooth. Branches opposite, decussate. Leaves sessile, simple or tripinnatifid, segments narrow, linear, smooth. Peduncles solitary, short, bearing near their apex, two or three subulate bracts. Calyx tubular, striated five-cleft, divisions slender, acute. Corolla wide funnel-shaped, throat inflated, limb somewhat two-lipped, spreading, five-cleft, lobes obtuse, reddish, with a deep-coloured spot on the under lip. Stamens didynamous; filaments incurved somewhat hairy, red. Anthers four, the lower pair united, the upper ones separate, incumbent (one fertile cell erect, the sterile cell descending spur-shaped sharp); sometimes, though rarely, a fifth perfect stamen is present. Style filiform, stigma enlarged, truncate. Capsule two-valved, valves bearing the partition, seminal receptacle large, red in the middle, bearing innumerable small, ovate-oblong seeds." *Wight MSS.*—The variety *β.* only differs in the smaller flower.

TAB. XI. Fig. I. Calyx laid open, showing the Pistil. 2. Corolla laid open. 3. Stamens. 4. Section of the Ovary :—*magnified.*

49. *G. scabra* (Linn.! Suppl. 279.) glabra, foliis oblongo-lanceolatis integris vel cuneato-3—5-fidis, margine scabriusculis, dentibus calycinis lanceolatis tubo vix brevioribus,, corollis tubuloso-campanulatis calyce plus triplo longioribus.

HAB. Cape of Good Hope. (*v. s. sp.*)

Root perennial. Stems six inches to a foot high, usually simple. Flowers subsessile, near together. Corolla an inch long, apparently purple. Filaments hairy.

41. *G. obtusifolia,* caule apice hirsuto, foliis oblongo-lanceolatis integris subdentatisve obtusis scabris glabris, dentibus calycinis lato-lanceolatis obtusis tubo demum subinflato vix brevioribus, corollis tubuloso-campanulatis calyce duplo longioribus.

HAB. Madagascar, *Herb. Hooker.* (*v. s. sp.*)

Stems apparently simple, a foot high. Flowers of *G. scabra,* but the calyx larger. Filaments almost glabrous. Empty cell of the anthers terminated by a long point.

42. *G. filiformis* (Schum. Beskr. Guin. Pl. 272.), foliis filiformibus scabris, pedunculis oppositis brevibus unifloris subsolitariis. (Schumacher.)

HAB. Near Pramprom and Ningo, in Guinea, *Thonning.*

Corolla pale purple; throat large campanulate. Anthers bipartite, the lobes oblong unequal diverging. (Schumacher.)

VIII. GLOSSOSTYLIS. *Cham. et. Schlecht.*

Starbia, *Pet. Th. Nov. Gen. Mad.* 7 ?

Calyx *campanulatus,* 4—5-*dentatus.* Corolla *oblique campanulata, breviter* 5-*loba limbo inferne majore.* Stamina *didynama.* Antheræ *omnes fertiles, loculis æqualibus basi acutis.* Semina *intra membranam lineari-cuneatum tenuissimam minima.* Herbæ *Americanæ, Austro-Africanæ vel Austro-Asiaticæ, asperæ, erectæ, habitu fere Melampyri.* Folia *opposita, sinuato-dentato, floralia* (*seu bracteæ*) *basi latiora profundius dentata, apice acuminata.* Flores *subsessiles, solitarii, alterne spicati.*

1. *G. Avensis* (Benth. Scroph. Ind. 49.), foliis ovato-lanceolatis lanceolatisve basi cuneatis brevissime petiolatis cauleque tuberculoso-asperis, calycis dentibus latis acutis brevissime ciliatis.

Hymenospermum dentatum, *Benth. in Wall. Cat. n.* 3893.

HAB. Taong Dong, a mountain near Ava, *Wallich.* (*v. s. sp.*)

2. *G. aspera* (Cham. et Schlecht. Linnæa, 3. 22.), foliis subsessilibus oblongo-lanceolatis basi truncato-cordatis cauleque hispidis asperrimis, calycis dentibus latis acutis bracteisque hispidis.

HAB. Brazil, from Bahia to the Southern Provinces. (*v. s. sp.*)

3. *G. capensis* (Benth. Scroph. Ind. 50.), foliis subsessilibus ovato-cordatis, inferioribus obtusis superioribus acuminatis cauleque tuberculis minutis scabris lævibusque, dentibus calycinis lanceolatis acutissimis bracteisque subnudis glabris.

Rhinanthus scaber, *Thunb. Prod. Fl. Cap.* 98. ?

Bartsia scabra, *Spreng. Syst.* 2. 775. ?

Gerardia sessiliflora, *Vahl, Symb.* 2. 79.

HAB. Cape of Good Hope, Madagascar, *Herb. Hooker.* (*v. s. sp.*)

There is in Dr. Hooker's herbarium, a plant which appears to be a fourth species of *Glossostylis*, with the leaves of *G. capensis*, but hispid like *G. aspera*, and larger and more foliaceous calyxes than any of the others; but the specimens are too imperfect to be certain as to the genus.

IX.? PHTHEIROSPERMUM. *Bunge.*

Calyx campanulatus 5-fidus. *Corolla* campanulato-ringens, labio superiore plano bifido, lobis replicatis, inferiore paullo longiore trifido, fauce hiante. *Stamina* didynama rectiuscula. *Antheræ* liberæ loculis parallelis mucronatis. *Stigma* bilobum. *Capsula* rostrata, compressa, bivalvis, bilocularis, polysperma. *Semina* oblonga, angulata, membrana reticulata spongiosa involuta. (*Fisch. et Meyer, Ind. Sem. Hort. Petrop.* 1835.)

1. *P. chinense* (Bunge in Fisch. et Meyer, l. c.). Herba annua vel biennis, habitu, foliis, calyce et capsula. *Pedicularis palustri* haud absimilis, sed corolla fere *Mimuli*, sordide rosea, fauce lineis 2 flavidis notata. (*Fisch. et Meyer.*)

HAB. In China Boreali, *Bunge.*

X. CENTRANTHERA. *Br.*

The whole of the four species comprised in this genus, being East Indian, and having nothing to add to the characters given in my general Synopsis of East Indian Scrophulariaceæ, it would be superfluous to transcribe them on this occasion.

ACCOUNT OF M. DURIEU'S BOTANICAL EXCURSIONS IN THE MOUNTAINS OF ASTURIAS.

(Communicated by P. B. Webb, Esq.)

M. Durieu, a distinguished French officer, on half-pay, who had visited many of the Southern Provinces of Spain, during the Peninsular War, was desirous of investigating the Alpine chain of Asturia, which forms the continuation of the Western Pyrenees. His means not permitting him to execute this journey without assistance, M. Gay, Colonel Bory de St. Vincent, and several botanical friends, suggested to him the idea of forming a sufficient number of collections, to cover a part of his expenses. The following letters, addressed to M. Gay, give a summary account of the results of this interesting, and somewhat perilous excursion.

Gijon, May 22. 1835.

Sir,—I arrived here only on the 18th, after encountering such difficulties and obstacles, as, I really believe, would have induced many to abandon the enterprize, and return home in despair. The prevalence of contrary winds compelled us frequently to cast anchor in all the little ports of the coast, excepting precisely at Santander, where I was in hopes of receiving letters. I will not lose time in recounting the numberless difficulties that I met with, owing to the civil war now raging in Spain; suffice it to say, that I was almost an actor (a most unwilling one, so far as the flight went) in the horrible rout of Laqueitio, after the affair of Guernica, and that the master of our frail bark, having replied insolently to a Spanish cruizer, we narrowly escaped being run down by her.

[1] By mistake, in our last number, this gentleman's name was written "*Durieux.*"

The Duke de Frias, Spanish Ambassador at Paris, has nobly redeemed the promise he gave you, and I found a Royal Order at Gijon, by which my papers and instruments were permitted to enter, duty free.

My fears, that I should arrive here too late, are, happily, not realized. I confess that it surprized me greatly to find such a tardy vegetation, of which you may judge, when I tell you, that *Scilla verna*, *Stellaria Holostea*, and *Cheiranthus Cheiri*, are still in flower. I saw many interesting plants at the different ports where we touched, but was unable to secure them, from the impossibility of getting access to my paper, and that of the country is excessively bad; and though extravagantly dear, so scarce, that two quires are, with difficulty, obtained at a time. Notwithstanding this, at Castro, only three leagues from our frontier, to the West of Bilboa, and twenty-five from Bayonne, I was delighted to find, growing in the shady ravines, that splendid Fern, *Woodwardia radicans*, of which I laid in a large stock, drying the specimens in the best way I could, under my mattrass and among my linen. The vegetation of Castro appeared very extraordinary, but I was reluctantly obliged to leave it untouched. The Ferns, particularly, attain such a wonderful development as I never saw before: the *Aspidium Filix Mas, dilatatum*, &c. were at least five or six feet high, and fronds of *Woodwardia* measured full seven or eight feet in length. Laurels reach even to the sides of the mountains, and the *Menziesia Dabeoci* abounds every where. At Santona, the *Orange trees* are cultivated very extensively in the fields, and I was struck by seeing that alpine plants grew on the walls which enclosed these plantations. Here there was nothing to be done, as the mountains are at a considerable distance from the coast, and cultivation spreads over the whole intermediate space; notwithstanding which I found, yesterday, a Crocus growing on a small turfy eminence, and remembering the excellent Monograph you are preparing of this genus, I gathered some of the bulbs, the flowers being past, and have laid them by for the purpose of presenting them to you. Since I left Castro, I have not found any Orobanches; there I saw five or six of them, growing on as many different plants, within a hundred yards of one another, but they were still in the Asparagus state; the first on *Galium Mollugo;* the second on *Picris hieracioides?* (I am uncertain of the species, as the radical leaves only were developed); the third on *Vicia Bithynica;* the fourth on *Ivy;* the fifth was a beautiful species, of a violet colour, growing on *Smilax aspera* or *Silene nutans*, I do not quite know which. I must now conclude this letter, as I am about to proceed to Oviedo. Accept the assurances of my respectful attachment.

DURIEU.

Bordeaux, Nov. 8, 1835.

I have at last returned from my exploratory journey in the Western Pyrenees, and am here awaiting the arrival of my packages from Bayonne, soon after which I trust to have again the happiness of meeting my family. You are, doubtless, desirous to learn the results of a journey, to which you were the principal instigator. But before proceediug with such details as my time here will permit me to give you, I must, at once, state that these results are not quite so brilliant as you must have expected, and as I thought I had reason to hope. Allow me however to add, in justice to myself, that if I have not performed more, the blame is not attributable to me, as I effected all that was humanly possible; toiling almost unceasingly and without respite,—without allowing myself the slightest recreation; enjoying however, uninterrupted health, and in no wise disturbed by that political storm which was growling around me.

In the country that I explored with so much care, the vegetation, however, is but little different from that of Brittany and our Aquitanian provinces: few are the plants which indicate a new and unvisited region, though many of them are curious, and the whole may well be deemed interesting from the fact of their locality.

Between the Western Asturian chain, which I explored, and the central chain, traversed by the road from Oviedo to Leon, and which is the only point explored by La Gasca, there exist sixteen leagues of mountains, untrodden by the foot of any Botanist, and which must be infinitely richer than that range towards which I was directed. This chain consists of the mountains *de los Concejos, de Taberga,* and *Somiedo,* whose huge masses are chiefly composed of granite, mixed with primitive limestone, whilst the western extremity of the Asturian Pyrenees, precisely from the point where I began to explore them, is composed of schist, of which the perpetual disintegration allows but few vegetables to fix themselves in the soil. The heights are undulated and bare, frequently interrupted by vertical openings, intermixed with sharp pyramidal peaks, whose sides, covered with broken and unfixed fragments, are generally considered inaccessible. This formation constitutes a striking contrast with the granitic range of Somiedo, towards whose long and indented line of heights, I often turned my longing eyes, as I thought of the rich harvest they must afford; still I remained faithful to my schist, reserving for another year, the rocks of Taberga and Somiedo, if circumstances should permit, and if my botanical friends continue to patronize me.

Disembarking at Gijon about the middle of May, I was obliged to remain there ten days, which I employed in visiting the coast; but here, as throughout the whole line of Cantabrian shore, there is little or no beach, and I was able to collect but few marine plants, to which I added some autumnal species on my return, generally the same as abound on the coasts of France. From Gijon I proceeded to Oviedo, where the difficulties and troubles that arose on all sides to obstruct my progress, permitted me to do little or nothing during the five days that I remained there. An excellent old gentleman, formerly a competitor with Ortego for the Botanical Chair of Madrid, was my guardian angel here. He managed to appease the Civil Governor, who was about to send me to prison, (where I might perhaps have remained till now,) and obtained permission for me to continue my journey. To his kindness I shall have occasion to allude again, before terminating this letter.

In the beginning of June, I established myself at Grado, a small town a few leagues west of Oviedo, where I remained twenty-five days, exploring the neighbouring mountains, but these are covered, during the whole year, by such myriads of sheep and cows, that it is absolutely impossible to find a single spot which is not cropped, grazed, and shaven, as bare as one's hand. Not a single plant can develop its flowers under the hoofs of these destroyers; no spot is so retired, as to be secure from their all-devouring teeth. The vallies are cultivated, and produce excellent crops; still, though little pains is taken to clear them from such weeds as are injurious, they produced me but few plants which were worth my collecting, and the general vegetation bore a close resemblance to that of the valley of Nantes. Near Grado, however, I visited one of the most remarkable localities in the Asturias, the rocks near the bridge of Peñaflor, a perpendicular fracture, through which the river Nelon has burst its way to find a new basin. This spot, which had been recommended to my attention by Bory de St. Vincent, offered me several interesting species, as the rocks are perfectly inaccessible, even to the goats. I hazarded myself upon some of their points, and have brought away a certain number of rare plants. Above these rocks, the mountains were again quite naked and eaten close, and nothing could be found.

The particular character of these rocks consists in their union of southern and subalpine vegetation. For the first time, I saw two grasses which I afterwards found to be inseparable companions, and quite peculiar to the Asturias; they met me every where on the high western chain, and always growing together, even on the loftiest peaks.

From Grado, I turned towards the South-

west, and shifted my head-quarters to Canjas de Tineo, a small town at the foot of the high range which separates the Asturias from the kingdom of Leon, and I was not a little surprized to find vegetation more advanced in the vallies of this cold region, than it had been in the country I had just quitted. These vallies are so narrow, as but just to admit the passage of a rivulet, and of the pathway which winds by its side. The shelving slopes of the adjacent mountains are cultivated to a considerable height, by the poor and industrious Asturians, while the more elevated portions and the very summits themselves, being incessantly covered by flocks and herds, here as elsewhere, offer nothing but a close shaven turf, mixed with heath and dwarf rushes. Thus my harvest was again slender. Common, however, as the plants were, I was careful to select such as seemed most characteristic; and now and then, *longo intervallo*, I found some rare species and even had the happiness, occasionally, to detect some strange vegetables, of which the forms were quite new to me. I consoled myself for what I considered but very moderate success, by thinking of the abundant harvest of rare Alpine species, destined for me to gather on the lofty mountains, which I saw were still covered with snow: and in the commencement of July, having hired a guide and a mule, I eagerly hastened towards the most elevated point in that chain. Judge of my disappointment at finding these summits little richer than the lower districts! I hardly saw one of those numerous small species, which adorn the peaks of our loftier Pyrenees. Myriads of sheep from Leon and the two Castilles, devour even the roots of those few vegetables which these masses of schist produce. Those which I have collected, have been obtained with extreme difficulty, most of them being procured from perpendicular steeps, inaccessible to the goats, whose ravenous teeth have even mutilated several of my specimens. The *Ranunculi*, the *Potentillas*, the *Hieraciums*, the *Saxifrages*, so numerous on other mountain ranges, have here few or no representatives. That portion of the chain, which I examined, becomes gradually lower, and at its highest point is still of inferior elevation to the mountains of Somiedo, on several of whose peaks the snow lies all the year round; whereas, on the two loftiest summits of the western chain, namely that of Arvas and that of Canellas, the snow is completely melted during the month of July; which gives them a height, about equal to that of the mountain at the pass of Penasque.[1] These two peaks, distant about nine leagues from each other, constitute, the first-named the eastern, and the second, the western, limit of that portion of this lofty chain which I have explored. It was not long ere I perceived that these two summits, and the mountain-masses from which they rise, are richer in plants than the intermediate and less elevated region, and to them I therefore particularly directed my attention. The peak of Arvas struck me as the most interesting of the two, and therefore, though lying the farthest from my head-quarters at Canjas de Tineo, I gave it the preference. It must not be confounded with the mountain of Arvas, frequently mentioned by La Gasca, which is situated twenty-five leagues further east, and is crossed by the road from Oviedo to Leon. To the peak of Arvas I made seven journeys, and remained there nineteen days; so that I think I may safely consider myself to be well acquainted with its botanical productions, and am competent to make them known to others, by the specimens which I brought away.

My last visit was made solely for the purpose of gathering the seeds of a beautiful *Genista*, with white flowers, which would prove a highly ornamental garden shrub, and those of a magnificent *Eryngium*, which was entirely new to me. My journey, however, proved quite a failure, the seeds of the *Genista* were scarcely sufficiently mature to give me hope of their germination; and those of the *Eryngium* were still less perfect, though both had been out of flower full two months.

The summit of the cone of the peak of

[1] About 7,200 feet.

Arvas, presents a very small *plateau,* only a few feet square. I took a note of the phænogamous plants, growing on this confined space, which I transcribe, in order to give you some idea of the vegetation of these Asturian Pyreneés;

Linaria supina—*Iberis conferta* (La Gasca). —*Jasione montana.*—*Phyteuma hæmisphærica.*—*Statice Armeria.*—*Juniperus depressa* (nob.)—*Agrostis rubra.*—*A. Asturica* (nob.)—*Aira Asturica* (nob.) —*Sedum brevifolium.*—*S. Anglicum.*—*Bunium Bulbocastanum.*—*Festuca Eskia, F. glauca,* and *F. spadicea.*—*Leontodon?* —*Lotus corniculatus.*—*Silene geniculata* (La Gasca). *S. nutans.*—*Galium Mollugo,* (a small alpine form).—*Chrysanthemum anomalum* (La Gasca).—*Dianthus hirtus?*—*Plantago graminea.*

A remarkable fact, and which proves the uniformity of vegetation in these schistose mountains, is, that the summit of the peak of Canellas, which has likewise its plateau, presented me with the identical same species as above, with the single exception of *Agrostis rubra.*

Towards the most westerly parts of this chain, extend those lofty forests, celebrated for the noble timber which they once yielded, and which they still produce. Now, being filled with bears, wolves, and lynxes, they are the object of dread to the timid Asturians, who dare not venture within their limits, even to collect a part of the immense quantity of dead wood which has lain rotting there for nearly half a century. So difficult was it to find a guide who would consent to accompany me into the forest, that I ventured alone into this immense solitude, and advanced as far as prudence and the recollection of my wife, child, and aged mother, would permit me. You would tax me with romance, did I attempt to describe the sensations which fill the mind in such a situation.

The last time that any of these trees were felled, which was for naval purposes, was more than thirty years ago, and the timber has never been removed. Thousands of beeches and oaks, of colossal dimensions, lie here and there, entirely decayed, and half buried in the soil which has accumulated around them. The two days which I spent in this excursion were quite profitless, so far as my Herbarium was concerned; I did not bring away a single species of flowering plants, which seem indeed, unable to exist in these deep umbrageous woods, and of *Lichens* I found only those large foliaceous kinds, common to all the European forests, and discovered no trace of *Sticta aurata* and *crocata* of the forests of Brittany, which I thought myself sure of gathering.

Upon the whole, as the result of my journey, I shall have from three hundred and sixty to three hundred and eighty species to distribute, as characteristic plants of the country I have explored. Among them will be some *Cryptogamia,* and about twenty *Ferns.* I much regret the not having found *Hymenophyllum elegans,* which Col. Bory de St. Vincent discovered at Luarca, and which I sought for in vain over a long line of coast.

There is a small number of excellent species, which it was impossible for me to collect in such quantities as to fill up all the collections. In this case, I have taken care to bring away ripe seeds, which I shall plant, and distribute specimens of them hereafter. Nor did I omit to gather seeds of all such species as appeared interesting, and I shall sow them myself, and attend to their cultivation with the greatest care. Immediately on reaching home, I mean to sow, under glass, in hopes that it may blossom in the spring, a species of *Barbarea,* which I consider one of the most curious in my whole collection. I also collected a quantity of seeds of a lovely *Hesperis,* equally remarkable for its beauty and for the exclusive habitat which it affects. At the distance of a short league from Canjas de Tineo, precisely at the highest point of the road, where it crosses the mountain, before descending into the valley of Corias, is situated a small village, called Puelo. I first saw the plant on my way to Canjas de Tineo, as walking slowly with my eyes fixed on the ground, I followed the *procession pace* of the half-starved mules which carried my baggage. A few

yards from the first houses of Puelo, I perceived this beautiful plant, growing in great abundance, with no transition from a few scattered bushes to this plentiful supply. It accompanied me to Canjas, first on the right hand and then on the left, according as the sloping bank presented itself on either side of the road. Soon afterwards, I was enabled to trace it to the other end of Canjas de Tineo, where it takes a turn and follows the valleys of Naviego and Narcea, as they rise upwards, for about a league and a half in the first, and three quarters of a league in the second, without ever quitting the sloping sides of the adjacent mountains which inclose the road, and at length disappeared altogether at an elevation which seemed to me, by approximation, to be about that of the village of Puelo. The singularity of this station has not escaped the observation of the inhabitants, who assure me, that beyond the limits I have named, this plant is not to be found in the Asturias. I cannot, from my own knowledge, vouch for this latter fact, but it is most certain that I met with no trace of it any where else. When cultivated, this little, bushy, evergreen shrub, with its thickset, linear, grass-like leaves, and large, violet, sweet-scented flowers, will become quite an acquisition to our gardens. If kept cut, it will produce its blossoms throughout the summer, as I perceived by the branches, which had been browsed upon by the cattle, and might make a beautiful low border, particularly if, as is probable, the petals become double. I have never met with this species in any collection, and am therefore inclined to consider it as new.

You will, I trust, pardon me for making this long digression in favour of my *Hesperis*, and though I have several species which I consider equally curious, I reserve their history for the *Catalogue raisonné* which I mean to publish of my collection. Nor will I tax your patience by swelling this letter with the personal minutiæ and anecdotes of my journey, though I must redeem my promise of giving you, very briefly, however, some account of my friend and protector, M. Perez of Oviedo. From his earliest youth, he appears to have been passionately fond of botanical pursuits, and had made so much progress in the science as to aspire, at the same time as Ortega, to the Botanical Professorship at Madrid. Disappointed in this object of his earnest wishes, he retired for life to his native Asturian valleys. There, long ere the *Geography of Plants* had received much attention from Naturalists, he observed that his own province was very interesting in this respect, and commenced a series of expeditions to elucidate the subject, but had made little progress when, herborizing one day, a few leagues from home, near a town where he was not known, he was observed climbing among the rocks. This sight excited so much astonishment, that the Corregidor was speedily informed, who determined on starting himself, accompanied by his alguazils, to ascertain the fact. Finding a well-dressed person clambering among the steep places, and labouring hard in some pursuit which he could not comprehend, the Corregidor concluded that some secret demoniacal work was in hand, and accordingly, seizing and stripping the hapless Botanist, and taking from him all his money, he ordered him forthwith to be carried to prison, and shut up in the *calabozo* (dungeon). There he might probably have died of want and misery, had he not hit upon a well-imagined mode of escape, too long, however, to be narrated here, by which he delivered himself from this unmerited captivity. His botanizing excursions were thus quite suspended; but the dormant spark of science, so rudely smothered above forty years ago, though now burdened with the weight of fourscore years, is not yet extinct, and my appearance in the vicinity of Oviedo suffered to rekindle it into a flame. You would scarcely believe that he is about to resume the scientific researches which were so harshly arrested; and that he has commenced teaching some of the young students from the University of Oviedo, and on my return from the mountains he assured me that he had already some pupils who were about to aid him in his employments. What he

most desires are books, and I shall have the pleasure of consulting you, Sir, as to those which are likely to be most serviceable to him. The good old man was of such effectual service to me, that without his aid, I never could have prosecuted my journey, and I am therefore anxious to dedicate to him one of my new species. Our learned Academicians may be, and probably are, satiated with these marks of scientific honour, but I am sure that the excellent Perez would be delighted in the highest degree, if there existed in his native province a plant, named after himself.

I confess, Sir, I feel some repugnance to open a subscription for these collections. I should much prefer giving or exchanging them, but the very moderate nature of my income, and the duty I owe to my family, render it imperative upon me to take this course, not for the purpose of gain, but to cover, if possible, a portion of the expenses of my journey, which have considerably exceeded my income, even without the loss of my half-pay, which, according to the regulations of the army, has been suspended during the seven months I have been away from France. If I am aided by the botanical world, the fatigues, privations, and crosses I have encountered, will not deter me from undertaking a second, or even a third journey, if it were necessary. My first should have for its object the exploring that chain which extends from the peak of Arvas to the pass of Pajares, over which the road from Oviedo to Leon is conducted. The second should be devoted to the lofty Sierras of Infiesto and Cobadonga, up to the Biscayan Pyrenées, whose vegetation doubtless differs little from that of the Western chain on the French side. We shall have opportunities of talking of these plans hereafter; meanwhile, I beg you, Sir, to accept the assurance of attachment of your very faithful servant,

DURIEU

P.S. I have received my packages, and am grieved to find that one is seriously injured. I have been obliged to throw away a large parcel, composed chiefly of plants of the genus *Atriplex* and a mass of *Fuci*, which I much regret. This loss will, I fear, lessen the number of species in my collection.

(N.B. Persons desirous of obtaining collections may send their orders, in English, to "M. Durieu, aux soins de M. Gay, rue de Vaugirard, No. 36, à Paris." They are requested to make use of thin paper, and to wafer, instead of sealing, their letters. The price of the collections has not yet been fixed, but will be very moderate.)

ILLUSTRATIONS OF INDIAN BOTANY.

By Dr. Wight & G. A. W. Arnott, Esq.

(Continued from p. 119.)

GREWIA VILLOSA.

TAB. X.

Foliis basi 5-nerviis rotundato-cordatis rugosis dentatis, dentibus barbatis, supra scabris subtus brevi-tomentosis venis nervisque villosis, inflorescentia petiolis foliisque junioribus valde villosis, pedunculis brevissimis, pedicellis umbellatis 5—6 in singula axilla petiolo brevioribus, sepalis lineari-lanceolatis petala oblonga integerrima obtusa triplo excedentibus, toro glandulis non longiore, stylo apice incrassato staminibus longiore, stigmatis lobis dentatis, drupa globosa villosa, nucibus 4-singula uniloculari.

Grewia villosa *Herb. Bottl. Klein. et Heyne, Willd. Sm. in Rees, Cycl. Roth, Nov. Sp. p.* 248. *De Cand. Prodr. v.* 1. *p.* 512. *Spreng. Syst. Veget. v.* 2. *p.* 581. (*excl. Syn. Roxb.*) *Wall. L. n.* 6306. *Wight, Cat. n.* 265. *Wight et Arn. Prodr. Fl. Penins. Or. v.* 1. *p.* 79.—G. orbiculata. *Don, in Mill. Dict.* (not Rottl.)

A native of subalpine jungles in the central provinces of the Carnatic. The specimens figured are from the Saline Mountains.

A large ramous *shrub*. Older *branches* round, smooth, the young ones, as well as the young leaves, densely clothed with long, soft, ferruginous pubescence. *Leaves*

alternate, orbicular, cordate, unequal at the base, ciliato-serrate, softly pubescent on both sides, the nerves connected with numerous transverse veinlets, prominent on the under side, on the upper occasioning a wrinkled appearance in the dried state. *Peduncles* lateral and axillary, shorter than the petioles, bearing a drooping umbel of four or five *flowers*. *Calyx* of five lanceolate leaflets, pubescent on the outside, ciliated at the margin, glabrous and orange-coloured within. *Petals* orange-coloured, half the length of the calyx, oblongo-spathulate, obtuse and erose at the extremity, hairy in the middle, and bearing a nectariferous cavity at the base. *Stamens* numerous. *Anthers* yellow. *Germen* globose, very hairy, inserted upon a reddish, shortly stipitate gland. *Style* shorter than the germen. *Stigma* four-lobed, lobes fimbriated. *Berry* the size of a small cherry, rough and hairy, bearing from two to four seeds.

TAB. X. Fig. 1. Flower. 2. Petal. 3. Pistil, with the Torus. 4. Section of the Fruit:—*magnified*.

DESCRIPTION OF MALAYAN PLANTS.

(*Continued from p.* 157.)

MEMECYLON PANICULATUM. *W. J.*

Foliis petiolatis ovatis obtuso-acuminatis, paniculis axillaribus brachiatis.

Found at Tappanuly, and on Pulo Bintangor, on the West coast of Sumatra.

A large *Shrub*, with grey bark and smooth branches. *Leaves* opposite, shortly petioled, ovate or oblong-ovate, terminating in a rather obtuse acumen, entire, very smooth, shining above, paler beneath, with pretty distinct nerves which unite into a line near the margin, seven or eight inches long. *Petioles* short and thick. *Stipules* none. *Panicles* axillary, sometimes from the axils of fallen leaves, oppositely branched; *peduncles* four-sided, purplish; there is, generally, a single one-flowered pedicel placed immediately below each of the principal divisions of the panicle, springing, as it were, from the same point. *Flowers* numerous, bluish. *Bracts* minute. *Calyx* nearly entire. *Corolla* light blue, four-petaled, petals broad, acute. *Stamina* eight; *filaments* subulate; *anthers* blue, prolonged behind into a thick spur, the upper surface of which is marked with a nectariferous cavity; cells on the anterior surface perpendicular to the spur, which is nearly horizontal, bursting longitudinally. *Ovary* one-celled, containing about eight erect ovula attached to a small protuberance in the base of the cell; its disk marked with radii corresponding to the faces of the anthers which are incurved before expansion. *Style* subulate. *Stigma* acute. *Berry* globular, one-seeded. *Seed* erect, exalbuminous. *Cotyledons* peltate, hemispherical, their flat surfaces a little irregular or waved. *Radicle* erect, rising perpendicularly between the cotyledons to their centre, where it is inserted.

OBS. This peculiar structure of the embryo is different from what obtains in all the other species of *Memecylon* that I have examined, where the cotyledons, in place of being solid and hemispherical, are foliaceous and contortuplicate.

OCTAS. *W. J.*

OCTANDRIA MONOGYNIA.

Calyx 8-partitus. *Corolla* 8-loba. *Stamina* octo, laciniis corollæ alterna. *Stigma* sessile, 8-radiatum. *Bacca* 8-sperma, supera.—Frutex, foliis *simplicibus alternis*, spicis *axillaribus*.

OCTAS SPICATA. *W. J.*

Found at Tappanuly, on the West coast of Sumatra.

A *Shrub*, with long branches; the young parts tomentose. *Leaves* alternate, petiolate, lanceolate oblong, acuminate, entire, smooth, five inches long. *Stipules* small, acute. *Spikes* or racemes two from each axil, rather shorter than the leaves, many-flowered; *pedicels* in threes. *Flowers* small, white. *Bracts* minute. *Calyx* small, eight-parted. *Corolla* monopetalous, spreading, divided at the margin into eight round lobes. *Stamina* eight, as long as

the lobes of the corolla; *anthers* white, subsagittate. *Ovary* superior, globular, eight-celled, eight-seeded. *Stigma* large, sessile, composed of eight fleshy coadunate lobes. *Berries* about the size of pepper-corns, purple, containing eight seeds, which are angled interiorly.

COELOPYRUM. *W. J.*

OCTANDRIA MONOGYNIA.

Calyx 4-partitus. *Corolla* 4-petala. *Stamina* 8, alterna breviora. *Stigma* obtusum, subsessile. *Drupa* supera, nuce biloculari, loculo exteriore lanato alterum fovente. *Semen* unicum, loculo altero vacuo.—Arbor, *ramis apice foliosis simplicibus*, floribus *racemosis.*

COELOPYRUM CORIACEUM. *W. J.*

Tarantang, Malay.

In forests in the neighbourhood of Bencoolen.

A *Tree* with thick branches, which are foliose at their summits. *Leaves* alternate, petiolate, elliptic, obtuse or emarginate, entire with reflexed margins, firm and leathery, smooth above, pale and tomentose beneath, costate with strong parallel ribs or nerves; ten to twelve inches long. *Petioles* about three inches long, marginate and flattened above. *Racemes* axillary, erect, shorter than the leaves, branched; *flowers* numerous, yellowish, small and inconspicuous, in small racemules or spikelets. *Bracts* small, acute. *Calyx* inferior, spreading. *Corolla* four-petaled, *petals* longer than the calyx, ovate. *Stamina* eight, the alternate ones shorter. *Ovary* surrounded and nearly immersed in a large fleshy nectarial ring, whose sides are angled by the compression of the filaments. *Style* scarce any. *Stigma* obtuse. *Drupe* ovate, acute, smaller than an olive, containing a single nut. *Nut* two-celled, cells unequal and dissimilar, the outer and lower crescent-shaped, and embracing the other which is smaller, oblong, and always empty; the larger cell contains a single conform *seed.*

OBS. The structure of the fruit is very peculiar; the empty cell is placed obliquely in the upper part of the nut, the fertile one is, as it were, wrapped round the other. The extreme minuteness of the ovary prevented me from satisfactorily ascertaining its structure.

PETROCARYA EXCELSA. *W. J.*

HEPTANDRIA MONOGYNIA.—Nat. Ord. ROSACEÆ. *Juss.*

CHRYSOBALANEÆ. *D C.*

Foliis oblongis acuminatis glabris, calycibus ore obliquis staminibus undecim fertilibus.

Kayu Balam Pangkat, Malay.

A large *Tree. Leaves* alternate, short-petioled, oblong, acuminate, entire, smooth, four to five inches long. *Stipules* longer than the petioles, deciduous. *Racemes* axillary and terminal, forming a panicle towards the top, strict, erect, little branched; *flowers* very short, pedicelled and appressed to the principal peduncle; the whole ferruginous and tomentose. *Bracts* broad, deciduous. *Calyx* infundibular, ferruginous and tomentose, oblique at the mouth, furnished with a ring of stiff hairs, which point downwards, lowest on the side to which the fertile stamina and ovary are attached; limb five-parted, subreflex. *Corolla* five-petaled, inserted on the mouth of the calyx, and scarcely longer than its *limb, petals* subround. *Stamina* eleven, fertile, twice as long as the petals, inserted in one phalanx along the lower edge of the mouth of the calyx; on the upper edge is a ring with eight processes or abortive stamina. *Ovary* adnate to the side of the calyx, below the fertile stamina, densely pilose, disporous. *Style* lateral, inserted near the base of the ovary, as long as the stamina. *Stigma* simple. *Drupe* inclosed in the enlarged calyx which becomes adnate to it, and crowned by its persistent limb; obliquely ovate, about the size of a filberd. *Nut* smooth, one-seeded, with an abortive cell, generally above the fertile one. *Seed* curved, corresponding to the cell, albuminous; *embryo* cylindrical, inverse; *radicle* superior, clavato-cylindrical, longer than the ligulate *cotyledons.*

PETROCARYA SUMATRANA. *W. J.*

Foliis elliptico-oblongis subtus canescentibus, calycis ore regulari, staminibus septem fertilibus.

A *Tree*. *Branchlets* pilose. *Leaves* alternate, short petioled, elliptic-oblong, six to eight inches long, terminating in a bluntish acumen, acute at the base, entire, the adult leaves smooth above, somewhat hoary with close short wool beneath, the younger ones covered with deciduous pubescence above, nerves prominent beneath, veins reticulate. *Petioles* about a quarter of an inch in length. *Stipules* longer than the petioles, oblong, acute. *Racemes* axillary and terminal, shorter than the leaves, tomentose; pedicels mostly three-flowered, divaricate. *Bracts* rather large, concave, at the base of the peduncles, pedicels, and flowers. *Calyx* tubular or campanulate, tomentose without, pilose at the faux, which is equal and regular, limb spreading, five-parted, segments acute. *Corolla* five-petaled, white; *petals* inserted on the mouth of the calyx, and as long as its segments. *Stamina* fourteen, of which the seven upper are fertile, arranged in one phalanx, and the opposite seven abortive; *filaments* short, flat; *anthers* roundish, two-lobed. *Ovary* adnate to the upper side of the tube or calyx, pilose, two-celled, containing two erect *ovula*. *Style* lateral, inserted at the base of the ovary, as long as the stamina. *Stigma* capitate.

Obs. These two species, though nearly related, present abundant points of distinction. In the *P. excelsa* the leaves are smaller, smoother, and less strongly nerved, while the flowers are larger, the racemes longer, more erect, and compact, and the stamina longer and more numerous than in the *P. Sumatrana*.

WORMIA EXCELSA. *W. J.*

Nat. Ord. Dilleniaceæ. *Dec.*

Foliis ellipticis acutis denticulatis, pedunculis multifloris oppositifoliis, pedicellis clavatis.

Kayu Sipur, Malay.

In forests near Bencoolen.—A large *Tree*. *Leaves* alternate, petiolate, from elliptic-ovate to elliptic-oblong, acute, denticulate or obsoletely serrate, smooth; eight to twelve inches long. *Petioles* deeply channelled above. *Peduncles* oppositifolious, at the summit of the branches, many-flowered; *pedicels* alternate, clavate. *Flowers* large, yellow, three inches in diameter. *Calyx* five-leaved, leaflets subrotund, concave, unequal. *Corolla* five-petaled, spreading, *petals* ovate oblong. *Stamina* very numerous, the outer ones yellow, spreading, shorter than the inner, which are purple, erect and recurved above; *anthers*, lobes adnate to the filament. *Ovaries* six to eight, connate, polysporous: *Stigmas* as many, flat, recurved, diverging. *Capsules* six to eight, whitish, semitransparent, bursting at the inner angle, and then spreading, containing no pulp. *Seeds* attached to the edges of the capsules, enveloped in a red aril.

Obs. This is a large forest-tree, which yields excellent timber, the wood having some resemblance to Oak.

WORMIA PULCHELLA. *W. J.*

Foliis obovatis integerrimis, pedunculis solitariis axillaribus unifloris, floribus pentagynis.

Found at Natal.

A small *Tree* *Branches* round, rather smooth. *Leaves* alternate, petiolate, oblong-obovate, rounded at top, with a short blunt point, sometimes retuse, very entire, very smooth, thick, and rather coriaceous; about five inches long. *Petioles* smooth, channelled, and marginate above, less than an inch in length. *Peduncles* axillary and subterminal, solitary, one-flowered, angled, about two inches long. *Bracts* none. *Calyx* five-leaved; *leaflets* subrotund, smooth. *Corolla* five-petaled. *Stamina* numerous. *Ovaries* five, collected into a globe, terminating in as many flat, reflexed, diverging *styles*. *Stigmas* thickened. *Capsules* five, of a light semitransparent rose-colour, bursting at their angles, and then spreading

like a corolla. *Seeds* attached to the inner edges of the capsules, a few only coming to perfection, partly embraced by a red pulpy aril, which originates from the umbilicus.

Obs. This species is very beautiful when in fruit, from the delicacy of the colours which the capsules exhibit.

FICUS OVOIDEA. *W. J.*

Foliis cuneato-obovatis apice rotundatis, nervo medio dichotomo, fructibus axillaribus solitariis v. binis pedunculatis.

Found at Singapore and on several parts of the West coast of Sumatra and its islands.

A small *Tree,* with smooth brownish *bark. Leaves* alternate, petiolate, cuneato-obovate, rounded above, attenuated to the base, very entire, very smooth, the middle nerve dichotomous, from one and a half to two inches long. *Petioles* nearly half an inch long, round, with a slight furrow above, and covered with grey *bark* like the branchlets, in pairs sometimes. *Peduncles* in pairs, sometimes solitary, shorter than the petioles, one-flowered. *Involucres* embraced at the base by three short subrotund bracts, nearly globose, smooth, shut at the mouth by scales, and containing numerous pedicellate florets. *Seeds* naked, hard.

Obs. The leaves are peculiar in having the middle nerve dichotomous, a character by which this species may be readily distinguished from its congeners.

FICUS DELTOIDEA. *W. J.*

Foliis obcuneato-deltoideis apice latis v. retusis, nervo medio dichotomo, fructibus axillaribus binis pedunculatis.

A small *Tree,* native of Sumatra, and very similar to the preceding, but having the *leaves* proportionally broader, more decidedly deltoid, and retuse or truncate, not rounded at top; the *peduncles* also are in pairs from the axils of the leaves, and longer than the petioles. The breadth of the *leaves* is generally greater than their length in this species, which is not the case with the preceding; they are, however, precisely similar in their leathery texture, and in having the nerve dichotomous, and not prominent.

FICUS RIGIDA. *W. J.*

Foliis ovatis lineari-acuminatis rigidis, fructibus pedunculatis axillaribus globosis glabris.

Seribulan, Malay, Sumatra, &c.

A *Tree,* with grey cinereous *bark,* and smooth *branchlets. Leaves* alternate, petiolate, ovate, or obovate, with long linear acumina, which are obtuse or emarginate at the point, attenuated to the base, three to four inches long, entire, firm, and rigid, smooth, shining above, rugose with reticulated veins beneath; nerves prominent beneath, the lowermost pair springing from the base, and running along the margins until they anastomose with the upper ones. *Petioles* brown, with cracked skin. *Berries* one to three, axillary, pedicelled, *pedicels* shorter than the petioles, smooth. *Involucre* globose, orange-coloured when ripe, smooth, with some whitish spots, as large as a currant. *Florets* numerous, pedicellate. *Female* ones with a four to five-parted perianth. *Style* inserted laterally; *seed* naked.

Obs. The bark of this species is fibrous, and I am informed that it is employed in Menengkabau in the fabrication of a coarse kind of paper.

JONESIA. *Roxb.*—Nat. Ord. LEGUMINOSÆ.

Calyx tubulosus, basi bibracteatus, limbo 4-lobo. *Petala* nulla. *Stamina* 3—7, summo tubo calycis inserta. *Ovarium* pedicellatum, pedicello calyci hinc accreto. *Legumen* oligospermum.—Frutices, *foliis abrupte pinnatis, floribus fasciculatis.*

The alteration I have here made in the terms of the generic description from that given by Roxburgh, will remove all obscurity as to the true affinities of this genus, and establish its near relation to *Macrolobium.* The bracteal leaflets (the diphyl-

lous calyx of Roxburgh) are found in both genera, though less conspicuous, and not coloured in *Macrolobium*, the stamina are similarly inserted on the mouth of the tubular calyx, and are equally variable in number, the pedicel of the ovary is accrete to the calyx in both, and the only difference consists in the presence or absence of the single petal which is found in *Macrolobium*, and is wanting in *Jonesia*.

JONESIA DECLINATA. *W. J.*

Foliis 6—8-jugis, foliolis oblongis, floribus fasciculato-paniculatis tetrandris.

Kayu Siturun, Malay.

A small straggling Tree, found generally in thickets, native of Sumatra.

Branches depending, whence the native name. *Leaves* alternate, composed of from six to eight pair of *leaflets*, of which the lowest are situated on the base of the *petiole*; they are opposite from ten to twelve inches in length, oblong, rounded at the extremity, but terminating in a short thick recurved point, entire on the margin, smooth. *Petiole* roundish, thickened at the base. *Stipule* intrapetiolar, embracing the stem, broad at the base, ovate and pointed. *Flowers* in lateral fasciculate panicles; two subrotund bracts below each flower; *pedicels* slender; the whole very smooth and delicate, and of a light semi-transparent red colour. *Calyx* reddish-yellow, tubular; *tube* narrow; *limb* four-parted, flat, segments subrotund, about the same size as the bracts. *Corolla* none. *Stamina* four, more than twice the length of the calyx, and inserted on its tube, the upper part deep red. *Anthers* deep purple, subrotund, two-celled, each cell streaked with white. There are no rudiments of abortive stamina. *Germen* pedicellate, pedicel accrete to the tube of the calyx. *Style* long, red. *Stigma* round. *Legume* pedicellate, flat, compressed, containing several *seeds*.

The large branches of delicate flesh-coloured flowers render this a very beautiful shrub during the period of inflorescence.

BAUHINIA EMARGINATA. *W. J.*

Foliis cordatis subrotundo-ovalibus glaberrimis acumine brevi obtuso emarginato, floribus octandris, staminibus tribus superioribus fertilibus.

Dadaub, Malay. Native of Sumatra.

A strong woody climber. *Leaves* alternate, petiolate, cordate, subrotund-oval, terminating in a short, blunt, emarginate acumen, very entire, four inches long, seven to nine-nerved, with reticulate veins, very smooth. *Petioles* rather short. *Cirrhi* long, simple, revolute. *Racemes* terminal or sometimes lateral, corymbose, many-flowered; *pedicels* long, tomentose. *Calyx* five-parted, tomentose, bursting into two or three segments. *Corolla* large, five-petaled, spreading; *petals* nearly equal, unguiculate. *Stamina* eight; three superior fertile, longer, with large two-lobed *anthers*; four inferior short, with small abortive anthers; the fifth and lowest being a little longer, and entirely sterile. *Ovary* tomentose. *Style* about the length of the fertile stamina. *Stigma* peltate, round.

Obs. The form of the leaf is very peculiar and readily distinguishes this species from the others.

BAUHINIA BIDENTATA. *W. J.*

Foliis cordatis acuminatis apice bidentatis glaberrimis, corymbis terminalibus, floribus octandris, staminibus tribus superioribus fertilibus.

Native of the Malayan forests, where it climbs over trees and shews its flame-coloured blossoms on their very summits.

Shrubby, climbing far over the trees in its neighbourhood; *bark* brown; *branches* round, flexuose; branchlets covered with ferruginous tomentum. *Leaves* alternate, petiolate, cordate, acute, bifid at the point, (not two-lobed), divisions approximate with a short thread interposed, very entire, seven-nerved, very smooth, the younger ones rather silky beneath with ferruginous deciduous hairs. *Petioles* thickened at the top and bare. *Tendrils* simple, revolute. *Corymbs* terminal. *Pedicels* clavate, striated, tomentose. *Calyx* five-parted, tomentose,

for the most part bursting irregularly into three divisions. *Corolla* orange-coloured, becoming red after expansion, five-petaled; petals nearly equal, subrotund, unguiculate, spreading. *Stamina* eight, ascending, of which the three upper are longer and fertile, and the three lowest short and sterile. *Anthers* subrotund. *Ovary* pedicellate, compressed, oblong, containing from six to eight ovula. *Style* declinate, incurved at the point. *Stigma* large, capitate and glutinous.

Obs. This species is at once distinguished by the peculiar form of the leaves, which are not two-lobed, as usual in the genus, but have the apex divided so as to make the leaf terminate in two acute points. The flowers are large and showy.

INGA BUBALINA. *W. J.*—Nat. Ord. Mimoseæ. *Br.*

Inermis, foliis conjugato-pinnatis, foliolis bi-jugis glaberrimis, capitulis paucifloris paniculatis, paniculis axillaribus et terminalibus, legumine recto cylindrico.

Bua Karbau, Malay. Sumatra, &c.

A *tree*, unarmed, with grey *bark*. *Leaves* alternate, conjugato-pinnate, leaflets two-paired, ovate, with rather an obtuse acumen, very entire, very smooth, nerves lucid; the upper pair of leaflets the largest. *Primary petiole* short, thickened at the base, bearing a gland at the point; secondary *petioles* without glands. *Capitula* few-flowered, panicled. *Panicles* axillary and terminal, peduncled, divaricate, shorter than the leaves. *Bracts* small. *Calyx* short, tubular, five-dentate. *Corolla* white, much longer than the calyx, campanulate, five-parted, segments spreading. *Stamina* many, monadelphous at the base, long and white. *Style* filiform, as long as the stamina. *Ovary* pedicellate. *Legume* dark green, straight, cylindrical, about four inches long, thick, obtuse, many-seeded, fetid. *Seeds* crowded, orbicular, piled one above the other and thus flattened above and below by their mutual compression.

Obs. This species is nearly allied in habit and inflorescence to the *Inga Jiringa*, Mal. Misc. vol. 1., but differs in the shape of the legume, which has a very offensive smell, but is eaten by the natives in the same manner as that of the Petek (*Acacia graveoleus*, W.J.). *Karbau* in Malay signifies the Buffalo, whence the specific name.

INGA CLYPEARIA. *W. J.*

Inermis, ramulis acutangulis, foliis bipinnatis, foliolis 10-jugis rhomboideis subtus tomentosis, paniculis terminalibus, leguminibus contortis rubris.

Clypearia rubra. *Rumph. Amb. III. p.* 176. *t.* 112.

Jiring muniet, Malay.

A large *tree*. *Branchlets* smooth, acutely five-angled, almost winged. *Leaves* alternate, bipinnate; pinnæ about four pair; leaflets about ten pair, rhomboidal, inequilateral, rather acute, entire, smooth above, tomentose or silky and glaucous beneath, they are of unequal size, the uppermost often two inches long. *Petiole* or *rachis* acutely four or five-angled, thickened at the base, eglandular. *Panicles* large, terminal; *peduncles* fascicled. *Flowers* white pedicellate, in small capitula or heads. *Calyx* small, five-parted. *Corolla* much longer than the calyx, quinquefid. *Stamina* numerous, monadelphous at the base. *Style* one. *Legume* red, flat, two-valved, spirally contorted, containing many subrotund, somewhat compressed, black *seeds*.

Obs. This species, which agrees with that described by Rumphius, is found in forests in the neighbourhood of Bencoolen, but I am not aware that it is there put to any particular use. These two species, together with the *I. Jiringa*, might perhaps with equal propriety be referred to *Acacia*, as the seeds are not arillate, though the legume (as in I. *bubalina*) is fleshy and esculent, the stamina are those of an *Inga*, and the paniculate inflorescence is more frequent in that genus than in *Acacia*. The distinction between these two sections of the Linnean genus *Mimosa* is an artificial one, and the characters of the present species are in some degree intermediate between the two.

(To be continued.)

BOTANICAL INFORMATION.

(Continued from p. 86.)

Erica *Mackaii*. Hook. Comp. to Bot. Mag. p. 158. This supposed species is of much interest to Botanists, as uniting two, apparently very distinct plants, *E. Tetralix* and *ciliaris*. The extreme forms of *E. Mackaii* gradually glide into the two other species. If the awns of the anthers fail; no other character, that I have seen mentioned, will keep them apart when a full series is examined. In *Tetralix* the awns equal the anther in length, while in *ciliaris* they are wanting. In *Mackaii*, however, the awns vary, from the proportion seen in *Tetralix* to less than a quarter the length of the anther; and the nearer the leaves and corolla approach to those of *ciliaris*, the shorter does the awn become. I think the awns do exist in all my specimens, though in some they are so minute as to be seen with difficulty. The objection to three species will be found in the fact of the extreme forms of *Mackaii* differing from each other as much as they do from *Tetralix* and *ciliaris*. If two species be retained, *E. Mackaii* must go to *Tetralix*. Whether a hybrid or not, in the proper sense of the term, it appears to bear nearly the same relation to *Tetralix* and *ciliaris*, that *Geum intermedium* does to *G. rivale* and *G. urbanum*. *H. C. Watson.*

Eriophorum *angustifolium* and *pubescens*. Can we count more species than these two? Winch says, in the *Flora of Northumberland and Durham*, "I suspect slender specimens of both *Eriophorum angustifolium* and *Eriophorum pubescens* pass under the name of *E. gracile*." I am sure that large specimens of each pass under the name of *E. polystachion*. Wahlenberg, in his *Flora Lapponica*, has described *E. gracile* "pedunculis scabris." *H. C. Watson.*

Crocus *nudiflorus*. Some of the Nottinghamshire specimens must be referred to *C. speciosus*, as described in the *British Flora*. I received them from Mr. Cooper. *H. C. Watson.*

Festuca *loliacea*. How is this to be distinguished from *Lolium?* Withering observes, that there is sometimes a minute inner valve to the calyx in the genus *Lolium*. Smith says that the inner valve of the calyx is sometimes wanting in *Festuca loliacea*; examples of which occur in my Herbarium. *H. C. Watson.*

Trifolium *filiforme*. I have a specimen of this (or, possibly, *T. procumbens*,) in which the corolla is not persistent. There are no seeds in the pods. Sent from Nottingham by Mr. Cooper.

Salix *Meyeriana* must be struck out from the British list, unless new evidence prove it British. I have convinced myself that my Brough specimen belongs not to that species, but to a Willow, of which I have a growing plant from the late Mr. Anderson's garden, a dwarf shrub, differing from both *S. Meyeriana* and *S. pentandra*. *W. Borrer.*

We are happy to be able to announce that the 5th and last volume of Sir James Smith's *English Flora*, (or the 2nd and last of Hooker's *British Flora*,) is at length completed, with the 2nd part of that volume, which is entirely occupied with the *Fungi*. Of the merits of this part, the writer of the present article is entitled to express his opinion, because, feeling his own incompetency to do justice to that obscure and difficult family of plants, he has procured the assistance of his valued friend, the Rev. J. Berkeley, who has long studied the Fungi with great attention, and who is now actually preparing (as already announced in this work) for publication a series of specimens illustrative of the British species. To this gentleman we are indebted for the whole of this portion of the Flora, and we are sure that in no Flora of any part of the world has the subject to which it relates been treated with more care and skill than have been here displayed by Mr. Berkeley. We possess now, what has long been a desideratum in this country, a *complete Flora*, including all the discoveries that have been made down to the period of its publication, and these arranged according to the latest improvements in the Orders and Genera.

The beautiful "*pocket volume*" of specimens of British Mosses, by Mr. Gardener, announced at p. 20 of this Journal, will be published in a few days. By the kind assistance of his Muscological friends, and especially of J. E. Bowman, Esq. of Gresford, he is enabled to make the sets more complete than he had originally anticipated. Almost immediately after the publication of this work, it is the intention of this zealous Naturalist to embark for South America, and to spend some years in collecting plants in various parts of Brazil. The dried specimens will be offered at the price of £2 the hundred species: and seeds and living plants on proportionably moderate terms. Pernambuco will, *probably*, be his first place of destination. It is gratifying to think that the Botany of South America, like that of the northern half of that immense continent, will be accurately investigated by British Naturalists. Chili has been successfully explored by Gillies, Cruckshanks, Bridges, Mathews; Mendoza by Gillies; Peru by Mathews and Cruckshanks; Colombia (in part) by Professor Jamieson and the late lamented Col. Hall; the Argentine Provinces, the Uraguay, Tucuman, and South Brazil by Tweedie; Guiana by Mr Parker and Dr. Schomburgh.

The following extract of a letter from the last-mentioned enterprizing traveller to George Bentham, Esq. may not be unacceptable to our readers:—

Anna-y, 3° 52′ N. lat. 59° W. long.
Nov. 1, 1835.

"Though I can announce the safe arrival of our expedition at the left bank of the Rupununy, I am sorry to say that all of us feel, more or less, the consequence of fatigue and exposures; fever and dysentery are the prevaling diseases, however, in no case to a dangerous degree, though my own servant insists upon returning with the people whom I hired at the port, having become alarmed at his own indisposition and the accounts of tigers, rattlesnakes, &c. the latter of which have paid us several visits since we took possession of our Indian hut.

I have collected about two thousand plants while *en route*, and our camp on the Savannahs, at the foot of an extensive mountain-chain, offers me a rich field for my collection. Lieut. Haining, who accompanies the expedition as a volunteer, leaves us in about three months from this time; with him I purpose to despatch all that will have been collected up to that period, plants, birds, and minerals: I do not consider the opportunity offered by the people returning to the port as sufficiently safe, or I might so send the plants.

I have inclosed a paper on the different species of *Lacis*, which I met with in the Essequebo. It is intended for the Linnæan Society. I have likewise drawings of several other plants, but I am rendered so weak, in consequence of fever and ague, as to be incompetent to finishing the papers connected with them.

Next spring you may expect with certainty the first collection of plants, with every prospect of their being numerous.

R. H. Schomburgh."

ILLUSTRATIONS OF INDIAN BOTANY.

By Dr. Wight & G. A. W. Arnott, Esq.

(*Continued from p.* 161).

CARISSA CARANDAS.

Tab. XII.

Sub-arborescens spinosa, glaberrima, spinis simplicibus vel in ramulos vetustiores bifurcatis, foliis ellipticis obtusis integerrimis nitidis reticulato-venosis, pedunculis corymbosis paucifloris terminalibus, ovario biloculari 8-ovulato.

Carissa Carandas. *Linn. Mant. p.* 52. *Willd. Sp. Pl.* 1. *p.* 1219. *Spr. Syst. Veg.* 1. *p.* 671. *Roxb. Cor. Pl.* 1. *t.* 77.; *Fl. Ind.* 1. *p.* 687.; (*ed. Car. et Wall.*) 2. *p.* 523. *Wall. List, n.* 1677.

Echites spinosa. *Burm. Fl. Ind. p.* 69.

Lycium Malabaricum, &c. *Pluk. Phyt. p.* 235. *t.* 305. *f.* 4.

Carandas. *Rumph. Amb.* 7. *p.* 57. *t.* 25.

A large *Shrub*, becoming, when old, a small, irregularly-shaped *tree*. *Branches*

numerous, dichotomous, divaricating much, terete, stiff, glabrous; *branchlets* compressed. *Thorns* opposite, at the forkings of the large and smaller branches; those on the former are once, or sometimes twice forked, on the latter usually simple, and occasionally wanting: all are very sharp, spreading, and glabrous. *Stipules* none. *Leaves* shortly petioled, opposite, oval, obtuse or slightly emarginate, quite entire, glabrous, shining, marked with the nerves and veins, slightly coriaceous. *Peduncles* terminal, from two to four together, corymbose, about an inch long, glabrous, each bearing three, four, or more *flowers*, on simple pedicels or forked partial peduncles; *pedicels* with a minute bractea at their base. *Calyx* five-cleft; *segments* triangular, acuminated, about the length of the tube, slightly pubescent. *Corolla* infundibuliform, many times longer than the calyx; *tube* greenish-yellow; *throat* naked; *limb* white, five-partite, spreading or slightly recurved; *segments* oblong, acute, scarcely half the length of the tube, pubescent. *Stamens* five, inserted above the middle of the tube of the corolla, and contained within it; *anthers* linear, acuminated, two-celled, nearly sessile. *Ovary* oblong, two-celled, with a thickened dissepiment. *Ovules* four in each cell, peltate. *Style* single, filiform, thickened at the apex. *Stigma* dilated at the base, bifid; divisions linear, ciliated at the apex. *Fruit* a glabrous oval berry, about the size, when ripe, of a small plum, two-celled; the dissepiment fleshy, thick in the middle, and bearing the placentæ. *Seeds* from one to four in each cell, oval, compressed, peltate, concave on the inside, at the middle of which they are attached to the partition or dissepiment, thin at the edges, destitute of coma. *Seed-coat* thin. *Albumen* copious, somewhat horny. *Radicle* superior, cylindrical. *Cotyledons* roundish, foliaceous.

In jungles and thickets, usually in good soil. It makes excellent fences. It is frequent in the northern Circars, where the berries are preserved by being boiled in syrup, and then used as damsons, for which they make a good substitute. It also occurs in Tanjore, but is less frequent than in the alpine districts.

Tab. XII. Fig. I. Pistil, the Calyx laid open. 2. Corolla laid open. 3. Section of the Fruit. 4. Ditto of Seed.—More or less *magnified*.

LORANTHUS CUNEATUS.

Tab. XIII.

Parasiticus glaber, ramis teretibus, foliis alternis obovato-cuneatis obtusis in petiolum angustatis, pedunculis axillaribus brevissimis vel sæpius nullis 4-floris, bractea cordato-ovata subovario, calycis tubo glabriusculo dentibus 5-ciliatis, corolla cylindracea breviter 5-loba, basin versus subincrassata, hinc longitudinaliter fissa, lobis linearibus unilateralibus reflexis, filamentis 5 ad apicem fere tubi corolla adnatis, antheris lineari-oblongis erectis, stylo filiformi, bacca oblonga.

Loranthus cuneatus. *Heyne, in Roth, Nov. Sp. p.* 193. (non *Wall.*, nec *De Cand.*)

Loranthus montanus. *Wight, in Wall.! Linn.* 6866.

Loranthus lobeliæflorus. *De Cand. Prod.* 4. *p.* 306.

Loranthus goodeniæflorus. *De Cand.? Prod.* 4. *p.* 306.

Parasitic. *Stem* and *branches* terete, glabrous, of a greyish colour, roughish from minute elevated points. *Leaves* alternate, obovate, obtuse or occasionally very slightly retuse, cuneate at the base, aad there tapering into a short petiole, glabrous, even the very youngest ones (and hence my doubts about the second synonyme quoted from De Candolle), quite entire, coriaceous; when growing, veiny; when dried the veins are sunk in the leaf, and nearly imperceptible. *Peduncles* generally wanting, and then from one to three pedicels issue from the axils, each one-flowered; sometimes the peduncles, although very short, may be observed bearing two, three, or even four, and very rarely five flowers. *Bractea* solitary, roundish-cordate, ovate, concave, obtuse or acute, ciliated, closely embracing the base of the calyx. *Calyx-tube* campanulate, generally nearly glabrous, but occasionally more or

less pubescent; *limb* five-cleft, segments rounded, ciliated. *Corolla* gamopetalous, tubular, slightly gibbous at the base, cylindrical upwards, shortly five-cleft, yellowish on the outside, the lobes about a sixth of the whole length of the corolla, oblong-linear, reflexed, and pointing all to the lower side of the flower, reddish on the inside; the tube is split up, from a little above the base to the apex, between the superior lobe and one of the lateral ones. *Æstivation* valvular. *Stamens* five. *Filaments* cohering with the tube of the corolla, and opposite the lobes; above the tube they are free, erect, glabrous. *Anthers* two-celled, narrow, oblong, erect from the apices of the points of the filaments. *Ovary* cohering with the calyx-tube. *Style* slender, filiform, protruded, a little curved near the apex, glabrous. *Stigma* capitate. *Berry* oblong, crowned with the remains of the limb of the calyx, one-celled, one-seeded. *Albumen* fleshy. *Radicle* superior.

On the branches of trees in alpine districts, I first found this plant at an elevation of between three and four thousand feet on mountains near Dindygul. I have since met with it much lower on the same range, but confined to them. Leschenault, however, found it on the Nulgherries. The specimens figured are from the village of Pathoocottah. Like most Peninsular plants, this has several native names, so that it is quite unnecessary, generally speaking, to quote them in botanical works. De Candolle, on Leschenault's authority, gives to this plant the vernacular name of *Viramarum-pila-rivi;* I could mention *Cautovelloomechamarum,* and several others equally barbarous. I may here remark, that Leschenault's names are frequently not to be depended on; from his total want of knowledge of the Tamul language, he was led to mark down the answers to his signs or queries as the names; whereas the natives mostly told him "I don't know," "I cannot tell," "I do not understand," "There is none," or made some such reply, which he fancied were the names of the plants.

(To be continued.)

REMARKS ON THE BOTANY OF BRITAIN, AS ILLUSTRATED IN MURRAY'S ENCYCLOPÆDIA OF GEOGRAPHY.

By H. C. Watson, Esq., F. L. S.

THE publication of the *Encyclopædia of Geography* may be regarded as in some measure marking an era for natural and geographical science, in Britain, being the first geographical work, by a British author, in which *scientific* Natural History occupies a decidedly prominent place; while the high celebrity, in their respective departments, of the individuals whose united contributions compose the work, stamp a value upon it, certain to insure a wide circulation, and cause it to be referred to as authoritative. Hence it becomes important that such a work should be accurate, even in its smallest details, and that no merely local peculiarities should tend to mislead readers, by bearing the semblance of general laws or facts, applicable to a whole country. This consideration may form a sufficient apology for the following comments on some points relating to the distribution of plants within Britain, in regard to which my own researches and observations lead to different conclusions, or which now require to be modified in consequence of recent discoveries, arising out of the increased attention lately given to local Botany by others.

Let it not be supposed that I find cause to censure the botanical department of the work in question, or wish to set up my own limited knowledge in opposition to that possessed by the author of such department. On the contrary, I would urge every British Botanist carefully to peruse the botanical sections, and dare promise that they who do so will not feel inclined to pronounce their time spent either unprofitably or unpleasantly. But all science is progressive; and he who devotes attention to any particular branch, may reasonably expect to find something in the views of others to be altered or to be added to. Moreover, it is a much easier matter to follow, and to correct in trifles, than to

lead and to originate; and were the botanical sections of the Encyclopædia of Geography united into a distinct work, such work would be a much superior treatise on vegetable geography, to any that has yet appeared in our language.

The title-page of the Encyclopædia bears the date of 1834; but from the time required to write and print so extensive a work, and other circumstances, it will be obvious enough that the greater part of it must have been written considerably anterior to such date. This is particularly noticed, because at intervals, since the autumn of 1832, I have made public several essays or papers on the same department of British Botany; but founded on more extended observations than had been published previously; and it becomes of some interest to examine any differences between these and the *earlier* and more local observations (by N. J. Winch, Esq., and the Rev. J. Farquharson) on which a considerable part of the section treating of British Botany, in the Encyclopædia, is founded.

1429.[1] The statement concerning the similarity of "the Botany of the different parts of the British empire," doubtless is intended to apply to the different parts in a political sense. Divisions of the surface, according to physical geography, present very different floras, and a still greater dissimilarity in the general physiognomy of their vegetation. Thus, of the species which are found above 4,000 feet up the Scottish mountains, only one-fourth exist on the plains of England; of those above 2,000 feet, about one-half descend to the plains. Again, not one-third of the species extend from the South to the North coast of Britain, even on the mainland; and the extreme islands, as those of the English Channel and Shetland, would have a much smaller proportion in common.

1430. As the science of vegetable geography is yet only commencing, it will be amusing, and not altogether useless, to compare the words by which the few writers on the distribution of British plants preface their statements, as indicating what a little is yet accomplished, and how wide a field is left open to others. Mr. Winch hopes that his "notes may ultimately prove useful to some Naturalist, who shall dedicate his time and abilities to this neglected department of British Botany." Mr. Macgillivray writes, "an attempt to describe the vegetation of a particular natural district, may excite persons better qualified than I profess to be, to present detached pictures of the vegetation of Scotland, from which a complete panorama may ultimately be constructed." The writer of the present remarks, in his *Outlines*, proceeds "under the impression that little will be effected until there is some general sketch," &c. The author, in the Encyclopædia, professes to "endeavour to throw together such remarks as may, at some future time, lay the foundation for a geographical distribution of our vegetables upon a more extended scale." However different the words, there is a close resemblance in the tacit admission by each, that his knowledge on the subject is neither so complete nor so precise as could be wished, and each looks to much future improvement through the instrumentality of others. I fear these are still substantially correct admissions; but would so far qualify the words of the Encyclopædia as to say, that the contributions of the different writers, taken together, *have laid* the foundation alluded to. Many are now diligently raising materials, that will gradually become shapely, however rough and rude at present, and then unite into a symmetrical superstructure.

But (if a few lines of digression are allowed me) for what end, some one may ask, is this labour to be given? Why should we seek to perfect a kind of knowledge having no immediate practical utility?—To many there is pleasure in the present pursuit—a pleasure injurious to none; and the facts to be thus brought together will ultimately lead to general conclusions, likely to lend material assistance to Physiologists

[1] These numbers refer to the paragraphs of the Encyclopædia particularly alluded to in the comments here made. It appeared better to follow the order of position in the work noticed, although unavoidably giving an abrupt and desultory appearance to remarks having reference to selected points only.

investigating the laws of vegetable development. These laws, when fully ascertained, will enable Man to add greatly to the advantages which he now draws from the vegetable world. He may appear "wise in his generation," but *he* is not wise or beneficial to his race, who professes to scorn the cultivation of *any* department of Natural Science, even in its minor details.

1431. In reference to this paragraph, I cannot help expressing regret, that in a *section* expressly devoted to the natural geography of Britain, and in which pretty extensive *sub-sections* are given to Geology, Botany, and Zoology, the subject of climate should be utterly passed by; as, indeed, in other countries also, excepting some good introductory remarks on Meteorology, with reference to the earth generally. It seems strange that meteorological notices should have been omitted, while matters of secondary interest entered so largely into the plan of the work. Whatever the reason, the geographic Botanist will regret this defect in a work otherwise so valuable.

1432—1434. So far, indeed, as the climate may be *guessed* from the vegetation, we do find it illustrated in the botanical sub-sections; and with reference to some of the remarks on cultivated vegetation, as showing the climate of the Channel Isles and "extreme southern coast of England," it may be added, that they will be found applicable, partially, to places rather more northward than is expressly stated. Thus, the orange ripens fruit against walls in *North* Devon, occasionally protected by matting in severe winters, though it is not certain that this protection is absolutely necessary. The *Myrtle* grows, as a standard, in gardens near the north coast of the same county. It also grows under the shelter of houses (not trained to their walls) as far north as Anglesea,[1] and bears the open air, against walls, on the inland banks of the Thames, where the winters are more severe. Still, these Mediterranean shrubs rather exist than flourish in England; and others, having more tender stems, as the *Fuchsias* and *Pelargoniums*, are often killed to the ground during winter, in the gardens of Surrey, though their roots survive; as they do more northward. In sheltered situations, in Surrey, the stems of the *Fuchsia* and *Oleander* survive the winter.

1436. On the Continent of Europe, inland, *vineyards* are said to exist in a latitude corresponding to the south of England. There seems little doubt that the south-eastern counties of England would produce grapes capable of being made into wine, but they could not be cultivated with success in a pecuniary light. The *Maize* will ripen seeds in England, but it cannot compete profitably with Wheat.

1440. In looking at the arithmetical tables of British plants, it must be kept in mind, that not only in *Gray's Arrangement*, but also in the *English Flora*, many species are included, which have no admissible claim to be ranked with British plants. Most of such being plants of more southern or warmer climates, the arithmetical proportions are thereby made to represent a climate superior to that which actually characterizes Britain. Instead of 1636 (*Gray*) or 1503 (*Smith*) species, it may be questioned whether twelve hundred perfectly distinguishable species are found native in the British Isles. What is the consequence of this undue swelling of numbers? Setting aside its tendency to perplex botanical students, and to make philosophic Naturalists turn in disgust from botanical (—— conceits?) let the reply be given in the words of Professor Henslow,—"it is not too much to say, that there are some genera whose species have possibly been multiplied four-fold beyond the number which they really contain. In consequence of this, our Flora appears to occupy a much higher rank among the Floras of different countries than it ought to do, and this must lead to very erroneous conclusions respecting the laws which regulate the numerical distribution of species in different latitudes."

1449. *Erica ciliaris* is now known to

[1] And in the Isle of Bute.—ED.

exist in Dorsetshire, and a station for it in a more northern county has been communicated to me, but this is not so satisfactorily made out as to authorize publication. That *Erica vagans* is limited to Cornwall, and *Sibthorpia Europæa* correctly included with the "quite southern plants," we have yet no sufficient authority to question, notwithstanding several localities have been published which would contradict either statement. The inclusion of *Lobelia Dortmanna* among the quite southern plants is, doubtless, a slip of the pen, *L. urens* being intended.

1450. The list of plants, "which do not reach the middle of the kingdom, and fail below the south of Scotland," now requires modification. *Acorus Calamus*, *Orchis pyramidalis*, and *Fumaria parviflora*, are now known to be Scottish plants. *Saxifraga Hirculus* has also been discovered in Scotland; and, together with *Cypripedium Calceolus* and *Anthericum serotinum*, it should rather be classed with plants *limited to* the middle latitudes of Britain. *Hippocrepis comosa*, *Orchis Morio*, and *Hottonia palustris*, do reach the north of England (Durham, or its borders), and the *Stratiotes*, *Butomus*, *Clematis*, &c. are said to extend into Scotland; but there is good reason to believe them not indigenous there. The very abundant *Teucrium Scorodonia*[1] appears to have slipped in accidentally for some other plant. *Scilla bifolia* and *Vella annua* can scarcely be called British plants, in any sense. These examples will suffice to show how very uncertain must yet be our attempts to point out the limits to the extension of species, even in well-botanized Britain.

1458, 1459. Very few species (except the very local ones) can be exclusively referred to the eastern or to the western side of England. A line, drawn along the western boundaries of Northumberland, Yorkshire, Warwickshire, and Hampshire, will divide England into eastern and western halves. By this division, above a hundred species are limited to the eastern counties, and between sixty and seventy species are confined to the western counties, Wales included therewith. But one half of these being peculiar to single counties, and the greater part of the rest occurring in only two or three counties, they cannot, with any sense of fitness, be taken as illustrations of distribution *connected* with longitude. Omitting such as these, and introduced species, we have few left. According to the evidence afforded by the New Botanist's Guide, out of species extending into four or more counties, not ten are exclusively western, nor twenty exclusively eastern species; and some of these extend quite into the midland counties, as Oxford and Warwick. A considerable number of species, however, are more abundant near the eastern or western coasts respectively; and some few of them, which do cross the middle line, fail to reach the opposite coast, as is the case with *Pinguicula lusitanica* from the west, and probably *Actinocarpus Damasonium* from the east coast. With respect to a few of the species mentioned in the Encyclopædia—*Luzula Forsteri* appears to be as frequent in the western as in the eastern counties. *Lithospermum maritimum* is not included in *Flora Devoniensis;* but the authors of that work appear not to have seen Turner and Dillwyn's Guide. A remark, no doubt intended for *Lobelia Dortmanna*, as to it not being limited to the west of Scotland, has been misplaced to *Lobelia urens* in printing. Is not *Primula farinosa* rather an eastern and inland, than a western species? It is mentioned as "most abundant in Cumberland." Doubtless it does occur in the county; though I have rambled a good deal in the central parts without ever seeing a plant of it; and by some accident have omitted it under that county, in the New Botanist's Guide. *Saxifraga nivalis* occurs in Wales and (according to Winch) Westmoreland, but has it been really found in Yorkshire? *Silene anglica* grows in many places along the western coast of England, from Cornwall to Lancashire. *Arenaria tenuifolia* appears to be found in

[1] For *Teucrium Scorodonia*, read *Teucrium Scordium*: but this has lately been found as far north as Yorkshire, by Mr. Bowman.—Ed.

a greater number of eastern than western counties.

1461, 1462. The first volume of the New Botanist's Guide has enabled me to make the preceding comments on the longitudinal distribution of plants in England, by affording a more extensive compilation of localities than existed at the time the Encyclopædia was published. The increased knowledge of local Botany in Scotland will probably induce to some alterations in the lists for that country, but I may freely confess an inability to improve these lists until the second volume of that Guide is completed.

1463. Are we entitled to call the *Beech*, the *Sycamore*, three species of *Lime*, and five species of *Elm*," aboriginal natives" of Britain?

1464. *Pinus sylvestris* is considered as "ascending, probably to the height of 2,500 feet upon the hills, among the northern Grampians." This is an important, and, in all probability, a correct statement, to which I shall have occasion presently to allude.

1465. The *Chestnut* is said (by Loudon) to ripen fruit[1] by the Firth of Forth; and I have been told that the Fig does so in Dumfriesshire. The Walnut is firm in kernel, but does not thoroughly ripen at Congleton, in Cheshire.

1470. We come now to the observations of Winch (*Essay*). This author considers the *Beech* (and, apparently, the *Sycamore* also) to be truly native in the north of England. *See* above, 1463.

1472. Mr. Winch informed me that *Ribes spicatum* is extinct, except in gardens.

1474. The Juniper ascends much higher than 1,500 feet in Cumberland. I observed it in different places above 2,000 feet, and on one hill (Grisedale Pike) it rose above 2,500 feet. It is very incorrect to call *Salix reticulata* the "usual attendant" of *Salix herbacea*. Few hills of 800 or 900 yards, in any part of Britain, are without *Salix herbacea*, while the other is probably limited to the Scottish Highlands, and not very plentiful there.

1475. It is stated that, *Calluna vulgaris, Erica cinerea*, and *Erica Tetralix* ascend to 3,000 feet of elevation, in the north of England. Unless this be a misprint (in the original Essay of Winch), it is certainly not a common occurrence. I believe no hills attain to this height in Durham or Northumberland. Most of those approaching to it, in Cumberland, were carefully examined in 1833, when, *contrary to my wishes*, I could not find a plant of the *Calluna* so high as 2,500 feet; and the two *Ericæ* have a still lower limit. Had we hills of 4,000 feet in this part of England, it is likely that plenty of *Heath*, the *Calluna* at least, would be found to 3,000 feet; for it grows at this elevation in Scotland. But small and exposed summits, sheep and fire seem to forbid its growth now. The discrepancy between Mr. Winch and myself on this point, is particularly noticed, because I had given the *Calluna* as a test to distinguish certain ascending regions of vegetation, the uniformity of which would have been more complete, had this shrub prevailed on the mountains of Cumberland up to 3,000 feet. In this paragraph of the Encyclopædia, "1,000" is a misprint for "100," and "fragrant" is probably a typographical improvement for "frequent."[2]

1476. *Oats* are here said to be cultivated up to nearly 2,000 feet. This is not at all common in Britain; indeed, we seldom see any cultivation of corn above 1,500 feet, a circumstance depending less upon the absolute elevation, than on the physical configuration of the surface, and the competition of more favourable situations, which yield greater returns for expenditure.

1477. I would cordially join in the

[1] Lord John Campbell lately showed me a number of young Chestnut plants which he had raised from seed which had ripened at Ardencaple, Dumbartonshire.—Ed.

[2] We might be almost tempted to suppose a conspiracy against Mr. Winch's Essay, on the part of the Compositors. I had occasion to quote his words about *Ulex Europæus* growing in "sequestered denes." Printed in Scotland, this was converted, most nationally, into "sequestrated denes." So, in the original, "Juncus *botanicus*" and "the Navelwort (Cotyledon *Umbellicus*") look very like intended improvements upon the real names.

hope that the Rev. Mr. Farquharson should continue his investigations. They are made in the true spirit of philosophical observation, directed to practical purposes; and joined to the observations of others, as remarked in the Encyclopædia, they will certainly be of much "service in forming a complete system of the vegetable geography of these islands."

1478. It is important, however, to attend to Mr. Farquharson's description of the tract to which they refer (Alford, in Aberdeenshire):—"a table land, elevated 400 to 600 feet above the sea, studded with many irregular ridges and groupes of mountains, of different elevations, up to 1,800 feet from the level of the sea." Such a tract is adapted to show the upper limits of cultivated vegetation, not rising naturally much above 500 or 600 feet; as also, the weeds of cultivated ground, and trees not greatly exceeding this height. But species, the general line of which runs between 1,000 and 2,000 feet, will probably yield in many places to the depressing effect of exposure, and have their proper limits modified by the configuration of the surface. Of course, the lines of such as usually exceed 1,800 feet of elevation, cannot be ascertained at all here. Mr. Farquharson's remarks being numbered 1, 2, 3, &c. the same course is followed below.

1. It is stated by this gentleman, that *Wheat* has been cultivated at 600 or 650 feet, but frequently failed to ripen, though producing abundant crops when it did ripen, in favourable seasons. Winch fixes the limit of wheat-fields at 1,000 feet in the north of England; and this grain is cultivated in Cumberland at a height, which I estimated to be from 800 to 900 feet. A statement in the *Agricultural Survey of Forfarshire*, would appear to place the line of Wheat on the Grampians, equally high as in the north of England. Mr. Brand, however, has intimated to me his belief that the height is over-estimated by 200 feet, or more; and it does not appear, from the work mentioned, whether it was a successful experiment to sow Wheat at this elevation. I have elsewhere (*Outlines*, 1832) expressed my conviction that the line of Wheat is usually much below 1,000 feet in the Highlands, and am glad to see it thus confirmed by Mr. Farquharson. Possibly Wheat might ripen in favourable situations and seasons, even at 1,000 feet; but it could hardly be a safe or economical speculation to a farmer.

3. There are cultivated fields, probably of *Bigg*, above Castleton, in Braemar, which is considered to be about 1,100 feet (Invercauld Castle, 1070 feet) above the sea; but I cannot state how much higher they extend—it may be 300 or 400 feet.

5. The suggestion that *Avena strigosa* might succeed above 950 feet, is borne out by a locality given for it in the British Flora, namely, "Dee-side, above Mar-Lodge, Aberdeenshire."

8. *Potatoes* are here stated often to fail in the Highland glens above 950 feet. I think to have seen them cultivated at 700 feet in the north of Argyleshire, and at 1,300 feet in Perthshire. The lines of cultivated plants appear to be much more depressed in the former county than in Aberdeenshire.

12. *Trifolium pratense* and *T. repens* are said to answer well when sown at 950 feet, and the last to be native even higher. Both rise much above this, as indigenous plants. The latter I have seen above the lake on Ben Lawers, which is somewhere stated (by Macculloch, I think,) to be 1,000 feet below the summit of that hill; hence, 3,000 feet above the sea.

20. Though not prepared to point out the exact line of the Oak, I am much inclined to say it will run above 700 feet in the latitude of Aberdeenshire. Indeed, I find the Oak mentioned in a list of species observed near Castleton, in Braemar, though with a suspicion of its being planted there. Macgillivray indicates the Oak and Ash to commence below Castleton.

22. Certainly 500 feet "cannot be considered as the furthest limit" of *Corylus Avellana*. Probably 1,500 feet is nearer the truth.

23. The *Alnus glutinosa* has about the same limit, or may ascend a little higher.

24. *Pinus sylvestris* I have seen to near 2,300 feet, though quite small; and, as before noticed (1464), its upper line rises to an elevation far exceeding any of the hills within Mr. Farquharson's district.

25. *Betula alba* is similarly circumstanced. Though uncommon above 2,000 feet, its natural line appears to run higher than that of the Scotch Fir.

31. *Ulmus montana* will grow at twice, perhaps thrice, the height of 500 feet; as, indeed, might be conjectured from the statement that it "becomes here a fine tree." *Populus tremula* succeeds far above the valley of Alford. Mr. Trevelyan observed it at 1,500 feet in the Isle of Mull; and I estimate it to be still higher in Braemar.

36. The natural line of *Rubus Idæus* exceeds that of *Corylus Avellana*. Perhaps it may attain 2,000 feet, though I cannot affirm that it does so.

37. *Cytisus scoparius* flowers at 1,500 or 1,600 feet, in Braemar, and grows yet higher, even to 1,800 or 1,900 feet.

38. *Ulex Europæus* occurs in a few places about Castleton, at 1,200 or 1,300 feet, but does not appear to be indigenous there. In England it exceeds the line of cultivation.

39. The upper line of *Lonicera Periclymenum* corresponds to that of the *Corylus* or *Alnus*.

With regard to Mr. Farquharson's concluding remarks, containing some valuable illustrations of the influence of physical agents on vegetation, I must take the liberty of questioning the supposition "that exposure does not modify the attainable elevation of the herbaceous and annual tribes." The statement is somewhat startling, and assuredly conflicts with my own observations made in other places; yet I can quite agree with Mr. Farquharson that the influence of exposure is much greater on trees and shrubs than on herbaceous species. This is partly explained by the circumstance, that slight inequalities of surface may counterbalance, in some measure, the ill effect of an exposed summit or declivity, so far as small plants are concerned, though yielding no protection to an Oak or a Pine. Moreover, plants may be over-sheltered as well as under-sheltered; and hence we often see alpine plants, instead of others, within deep valleys or glens, the walls of which shut out many hours of sunshine. The influence of situation on the growth of plants is so complex an inquiry, calling for such an exact estimate of many opposing or counterbalancing circumstances, that it might well supply materials for a life of observation. A stone or brick lying on the ground, may determine the torpidity or vegetation of plants near to it, for many days during winter, and their life or death during the heats of summer.

Before concluding, I beg to add, that Mr. Farquharson's observations bear in themselves the impress of accuracy, and are doubtless strictly applicable to the particular district illustrated by them. My additions and comments only go to prove that in other situations, more favourable to the ascent of plants, several of the species do rise higher than they are observed to grow in Alford. Indeed, Mr. Farquharson remarks on this being the case with the *Birch* and *Fir*. Other persons, enjoying better opportunities for such investigations, may find some of them higher than they have been noted by myself.

H. C. WATSON.

Thames Ditton, Dec. 1835.

CONTRIBUTIONS TOWARDS A FLORA OF SOUTH AMERICA AND THE ISLANDS OF THE PACIFIC.

By W. J. Hooker, LL.D. and G. A. W. Arnott, Esq. A.M. F.R.S.E.

(Continued from p. 111.)

SINCE the publication of our last Memoir on the "Botany of extra-tropical South America," we have had the pleasure of receiving three additional collections; the first gathered by M. Isabelle, at Rio Grande do Sul, in S. Brazil, and which we owe to the kindness of M. Delessert; the

second, a small but very interesting one, for which we are indebted to our friend, B. D. Greene, Esq., consisting of specimens from the southern provinces of Chili, chiefly in Araucania, made by J. N. Reynolds, Esq., author of the "*Voyage of the United States' Frigate, Potomac;*" and from whom we further expect the account of his "*Travels through the Republic of Chili and the Araucanian and Indian Territories to the South.*" The third collection just alluded to, was derived from Mr. Tweedie, and was made in Tucuman, a country extending from lat. 22. to 33. 10. 8. bounded on the west by the Andes of Chili, scarcely, if ever, before, visited by any Naturalist. So little, indeed, is known of that province, that Mr. Tweedie's letter to me, giving an account, very brief indeed, of his journey, may not be unacceptable to our readers. It is dated Buenos Ayres, Sept. 29, 1835.

(COPY.)

Buenos Ayres, Sept. 29, 1835.

"On my arrival from the interior, on the 2nd instant, I found your's accompanying the books, awaiting me, and again your's of the 22nd June, accompanying Mr. Fielding's of the 3rd July, by our last packet of the 17th instant; all of which I shall endeavour to answer to the best of my power. You herewith will receive the few things I have collected in my journey through the Provinces of *Santa Fè, Mendoza, St. Jago del Esterro,* and *Tucuman.* You will find it a very deficient collection to what might be expected after a journey of twelve hundred miles. My principal design in going to Tucuman was to collect seeds, in that reported fine woody country. On leaving this, on the 2nd March, with a troop of seventeen carts, I was told by the owner, that forty to fifty days was the usual time occupied in completing the journey, in place of which we were eighty-four days—nearly two months too late for seeds. In these upper Provinces no rain falls in the winter season, so that, as in some of my former travels, we suffered every privation that a severe drought could produce; my collections of seeds, plants, and specimens are consequently trifling. I find much benefit from having numbered those which I sent you three years ago, and I wish it had been done at first, and more correctly. I have therefore numbered these now transmitted, with the exception of the Grasses, which though interesting to some, possess few charms for me. Those now sent are principally collected in the vast plains which lay on our route, where nothing but Grass was to be met with. I have taken the liberty of troubling you with a box of seeds; being from a strange country, they may be in request for your Botanic Garden. They are mostly new articles from the Upper Provinces. In the box, with some other odd things, are two papers of seeds of the *Urtica* family; one I have marked *U. majestica;* it is a tree, with immensely large foliage, which I found in a thick moist wood, going up the first ridge of the Cordillera; the other is a very singular and showy plant, which I found also in the warm moist forests of Brazil: I consider them both as curious and interesting plants, and which I hope may succeed. The tree species gives a large branched cluster, of a lemon-colour, but it contained very little seed; and I only met with one plant of it. In the fine mountain forests of Tucuman, I saw some beautiful and strange trees; but nothing like the fine varieties to be met with on the coast of South Brazil. I met with a countryman from Perth, who was an officer in Beresford's army, and was sent up there with other prisoners. He remained, got married to a native, and has a large and beautiful wooded estate. He gave me a horse, and we set out together for two days to visit a branch of the snowy Cordilleras. We took most of the first day to climb the first elevation, though not exceeding 3,000 feet above the plain. We then came to a seeming flat, but on crossing it, about nine miles broad, found it considerably undulated with little hills and valleys, the high ground covered with coarse grass of the same species as on the plains, but completely withered with dry hard frost; the hollows furnished with the same species of trees as

on the first ridge, but what were trees are now shrubs; on coming to the bottom of the second, or main snowy ridge, we found nothing strange—stunted grass and some mosses destitute of fructification, nearly covered with splinters of soft blue, somewhat slaty rock, and melting snow; nothing to be seen; this soon sickened us of our climbing, so we retired to a Pongho for the night; next day we explored the woods a little better before returning to my friend's house, but met with very little. He has promised to collect me all the seeds of the principal trees, as they come in season. In going to those strange places, particularly in warm climates, where vegetation changes so fast, nothing can be got in short visits. A whole year is necessary to observe and collect the productions, as they come in season. I am truly sorry that as yet I am unable to send you either those insects or birds you want. The Prussian woman who collects them, as I told you, went up the Parana, collecting, more than a year ago, and has not yet returned to Buenos Ayres. I called on the House of Ludovic and Co., who are her friends, and they tell me they hear she died at Corrientes; but do not believe the report, as their correspondent there, to whom she was recommended, does not mention it; they think she has gone into the Province of Paraguay, and an acquaintance of mine from Corrientes says he saw her there last summer, wading to the armpits in the lakes among the weeds, collecting insects, and in a dangerous place, where alligators are so numerous that none of the natives dare venture there. Sometimes a few of these things are brought here from Brazil by the French, but being common articles, and sold very high, I do not like to purchase, and suspect you must be in possession of them, as Brazilian articles of that nature are so frequently brought to the market. My orders from London are to send from *this country*, but not from Brazils, as they are in abundance. I have not yet determined what route to take next; I wish to go rather further into the Missions, but this is difficult, as there is little communication. Perhaps I shall pay another visit to the Brazil coast, into the hilly province of St. Paul's, where I have not yet been.

(Signed) J. TWEEDIE."

The collection which was the result of this journey, though by no means what it would have been under more favourable circumstances, yet contains many excellent plants; and among them a charming specimen of a plant very nearly allied to the curious *Aphyteia* of Southern Africa, of which we before possessed only some fragments gathered by Dr. Gillies. Our advice to Mr. Tweedie has been, that he should follow up his intention of exploring the coast of Brazil, and especially the hilly district of St. Paul's.

TRIB. V.—VERNONIEÆ.—*Less. Syn. p.* 126.

SUB-TRIB. I.—VERNONIEÆ.—*Less. l. c.*

870. (1.) Vernonia *ericæfolia* (Hook. et Arn.); fruticosa, ramis angulatis glabriusculis, foliis alternis linearibus acutis, subtus tomentosis v. glabris nervo prominente marginibus reflexis, involucri hemisphærici foliolis acuminatissimis tomentosis apice squamosis, pappi serie exteriori brevissima sericea.—Buenos Ayres, *Tweedie*.—β. foliis capitulisque majoribus. Corrientes, *Baird*.—Nearly allied to *V. ericoides*, but the leaflets of the involucre are by no means ciliated.

871. (2.) *V. axillaris*, Less. *in Linnæa, v.* 4. *p.* 253.—St. Catharine, S. Brazil, *Tweedie*.—This seems to differ in some particulars from Lessing's *V. axillaris*, especially where that author describes the glomeruli as spicate: here they form a sessile rounded head. The nerves on the upper side of the leaf are certainly *impressed*. We possess a *Vernonia* from Rio, gathered by Mr. Douglas, precisely according with this, except that the nerves are slightly elevated on the upper surface, as in *V. splendens*, Less. *l. c.*

872. (3.) *V. ramiflora*, Less. *in Linnæa, v.* 4. *p.* 255.—St. Catharine, S. Brazil, *Tweedie*.

873. (4.) *V. notata*, Less. *in Linnæa, v.* 4. *p.* 256, S. Brazil, *Tweedie*.

874. (5.) *V. nudiflora*, Less. *in Linnæa, v.* 4. *p.* 258.—V. angustifolia, *Don, MSS.* (*non* Mich.)—Common in pasture-fields of Rio Grande and Banda Orientale, *Tweedie*. Rio Chorillo, Province of San Luis, *Dr. Gillies*.—This exactly agrees

with authentic specimens which we possess from Chamisso.

875. (6.) *V. nitidula*, Less. *in Linnæa*, *v.* 4. *p.* 260.—This, too, we have been able to compare with original specimens in our Herbarium.

876. (7.) *V. oligactoides*, Less. *in Linnæa*, *v.* 4. *p.* 247.—S. Brazil ? *Tweedie.*

877. (8.) *V. incana*, Less. *in Linnæa*, *v.* 4. *p.* 278.—Plains of Entro Rios, near the coast of the Paramo. Our specimens are too few and too imperfect to enable us to be quite certain of this species.

878. (9.) *V. scorpioides*, Pers. *Syn. v.* 2. *p.* 404. *Less. in Linnæa*, *v.* 4. *p.* 282. Conyza scorp. *Lam.* Lepidaploa scorp *Cass.*—*Saltz. Herb. Bahiæ. Compos.* 18.—V. tournefortioides, *Less. in Linnæa*, *v.* 4. *p.* 281. (*non Kunth*).—St. Catharine, S. Brazil, *Tweedie.* Uraguay, *Baird.*—We possess copious specimens of this species from Rio, gathered by the late Mr. Boog, by Mr. Burchell and by Mr. Swainson.

879. (10.) *V. ignobilis*, Less. *in Linnæa*, *v.* 6. *f.* 658.—Rio Grande, *Tweedie.*—If we are correct in our reference to this species, the leaves are sometimes five inches long and two broad, very scabrous on the upper surface. We have the same, or a closely allied species, from Rio, with the leaves more downy on the upper side, and the pappus more tawny.

880. (11.) *V. rubricaulis*, Humb. *Pl. Æq. v.* 2. *p.* 66. *t.* 99. *Less. in Linnæa*, *v.* 4. *p.* 299. V. linearis, *Don, MSS.* (*not* Less.) V. salicifolia, *Gill. MSS.*—Buenos Ayres, *Tweedie.*—Mendoza, *Dr. Gillies.*—This is precisely the same with Lessing's plant, from Paraguay, which that author refers to the *rubricaulis* of Humboldt and Bonpland, a native of New Grenada; and indeed the figure in the *Plantes Æquinoctiales*, above quoted, admirably represents some of our specimens. The capitula are sometimes solitary, axillary, and sessile, as in *V. sericea;* at other times corymbose or terminal.

881. (12.) *V. Sellowii*, Less. *in Linnæa*, *v.* 4. *p.* 304.—Rocky hills of Rio Jaquery, *Tweedie.*

882. (13.) *V. sericea*, Rich.—*Ker, Bot. Reg. t.* 522. *Less. in Linnæa*, *v.* 4. *p.* 295.—β. foliis minus sericeis. *V. acutifolia*, Hook. *Bot. Mag. t.* 3062. *Less. in Linnæa*, *v.* 6. *p.* 663.—β. South Brazil, *Tweedie.*—There can be no doubt but that *V. acutifolia*, Hook., as that author himself suspected, is only a slight var. of *V. sericea*, a very common species in Brazil, especially about Rio Janeiro.

883. (14.) *V. Chamissonis*, Less. *in Linn. v.* 4. *p.* 304.—St. Catharine, S. Brazil, *Tweedie.*—Salzman's "*Compos.* 39," of his *Herb. Bahiæ*, seems very nearly allied to this, but the leaves are broader, the nerves less crowded, the involucre much less downy, and the pappus is pure white.

884. (15.) *V. megapotamica*, Spreng.—*Less. in Linnæa*, *v.* 4. *p.* 368.—Dry knolls about Porto Alegre, S. Brazil, *Tweedie.*—β. foliis latioribus obtusioribusque. Porto Alegre, *Tweedie.* Province of Rio Grande do Sul, S. Brazil. *M. Isabelle, in Herb. nostr.*—Our *var.* α. precisely accords with specimens sent us by Chamisso: our β. only differs in its broader and more obtuse leaves.

885. (16.) *V. flexuosa*, Sims, *Bot. Mag. t.* 2477. *Less. in Linnæa*, *v.* 4. *p.* 311. —Banda Orientale, *Tweedie.*—To the following specimens in our Herbarium, we dare scarcely venture to give names, partly because of their paucity and imperfect state, and partly because of their close affinity with the present species, which is precisely that of Lessing; and from this they thus chiefly differ;

A. Capitulis paulo majoribus subglomeratis.—Saint Lucie, S. Brazil, *Tweedie.*

B. Capitulis duplo triplove majoribus. —Woods and fields of Banda Orientale, Rio Grande, and Rio Jacquery, *Tweedie.*

C. Capitulis duplo majoribus in ramos elongatos remotis.—Maldonado, *Tweedie.*

D. Capitulis parvis remotis in ramos erectis.—Via Monte, S. Brazil, *Tweedie.*

886. (17.) *V. Platensis*, Less. *in Linnæa*, *v.* 4. *p.* 312. Conyza Plat., *Spr.* Maldonado, Rio Jacquery and Salto, S. Brazil, *Tweedie.*—Very nearly allied to *V. flexuosa*, but a taller and stouter plant; very leafy to the base of its inflorescence, and even among the flowers.

887. (18.) *V. linearifolia*, Less. *in Linnæa*, *v.* 4. *p.* 287.—Maldonado and Monte Video, *Tweedie.*

888. (19.) *V. mollissima*, Don, *MSS.;* lanata, foliis lanceolatis acutis integerrimis, capitulis corymbosis, involucri squamis lanceolatis uncinato-recurvatis. *Don.*—Pampas of Mendoza. *Dr. Gillies.*—Whole plant exceedingly hoary, especially the stem and under side of the

leaves, which latter are distinctly penninerved. The specimens are not in full flower.—β. foliis superne glabris.—Pampas of Buenos Ayres and Santa Fè, *Tweedie* (*n.* 1108). This is probably the perfect state of the plant, the young specimens of Dr. Gillies not having lost the down on the upper side of their leaves. It is a fine and very distinct plant; the under side of the foliage always clothed with dense white wool.

889. (20.) *V. pyrifolia*, Don, *MSS.*; foliis petiolatis elliptico-oblongis argute serrulatis subtus ramisque tomentosis, capitulis paniculatis, involucri squamis obtusis, pappo simplici. *Don.*—*Dr. Gillies.*—This we have not seen, nor does its author mention its locality.

Sub-trib. II.—Elephantopodeæ. *Less. Syn. p.* 149.

890. (1.) Elephantopsis *quadriflorus*, Less. *in Linnæa, v.* 4. *p.* 322.—Elephantopus angustifolius, *Sw.*—Rio Grande, *Tweedie.*

891. (1.) Elephantopus *Carolinianus*, Willd. Less.—Coast of South Brazil, frequent, *Tweedie.*

Trib. VI.—Eupatoriaceæ. *Less. Syn. p.* 154.

Sub-trib. I.—Alomieæ. *Less.*

892. (1.) Alomia *spilanthoides*, Don, *MSS.*; foliis lanceolatis, involucris pedunculisque pubescentibus. — Between Casa Blanca and Valparaiso, Chili, and Saladillo, Province of Cordova, *Dr. Gillies.* Buenos Ayres, Uraguay, and frequent in standing pools on the coast of La Plata, bearing fragrantly scented flowers, *Tweedie.*—Three to five feet high. Leaves three to five inches long, lanceolate, coarsely serrated, petioled. The branches of the style of the outer flowers are frequently completely petaloid, all trace of the stigma being lost, and a strong nerve, branched at the apex, passing through the middle. Anthers always included. Ovary obovato-oblong, downy; epigynous disk very prominent, with a depression at the top.

Sub-trib. II.—Agerateæ. *Less.*

893. (1.) Stevia *lanceolata* (Hook. et Arn.); ubique pubescens, foliis lanceolatis trinerviis sub-serratis basi in petiolum brevem attenuatis, corymbis fastigiatis, pappi aristis tribus longitudine corollæ paleisque tribus brevibus.—S. puberula, *Don, MSS.* (*non* Hook.)—Andes of Mendoza, *Dr. Gillies.*

894. (2.) S. *multiaristata*, Spreng.; ubique pubescens, foliis linearibus obtusis integerrimis, corymbis fastigiatis, pappo multiaristato, aristis corollam paulo excedentibus.—S. tenuifolia, *Don, MSS.* —Abundant about Maldonado and clay banks at Buenos Ayres and N. Patagonia, *Dr. Gillies. Tweedie.*—Cordillera of Mendoza, *Dr. Gillies.*—There can, I think, scarcely be a doubt of this being the *S. multiaristata*, from the same country, of Sprengel, although the character differs in some slight particulars. We possess the same plant from Dr. Baldwin's Herbarium, also from Maldonado, marked, "*Kleinia suffruticosa.*"

895. (3.) *S. laxa* (Hook. et Arn.); pubescenti - hirsuta, foliis lineari-lanceolatis integerrimis basi obscure trinerviis, corymbis laxis, pappo multiaristato, aristis corollam paulo excedentibus. —Uraguay and Buenos Ayres, *Tweedie.* —Very nearly allied to the last, and probably a luxuriant variety of it.

896. (4.) *S. aristata* (Don *MSS.*); pubescenti-hirsuta, foliis lato-lanceolatis serratis inferne attenuatis trinerviis, corymbis laxis, pappo multiaristato corollam excedente.—Buenos Ayres, *Dr. Gillies.*—In this the leaves are distinctly serrated all round; and some of the lower ones are three-fourths of an inch broad.

897. (5.) *S. breviaristata* (Hook. et Arn.); glabriuscula, foliis ovatis s. ovato-lanceolatis trinerviis grosse obtuse serratis in petiolum attenuatis, corymbis densis, involucro pubescenti - viscoso, pappi aristis 3 subulatis brevissimis.—Woods of Tucuman, plentiful, *Tweedie.* —Apparently a tall plant, and herbaceous: some of the leaves two inches long, including the petiole. Pappus very short, of three subulate glabrous awns.

898. (6.) *S. gratioloides* (Hook. et Arn.); parva, glabriuscula, foliis subcordato-ovatis crassiusculis trinerviis sessilibus grosse serratis, corymbo laxo, pedunculis subunifloris. — Rio Grande do Sul, *Tweedie.*—This is a small plant, and very distinct from all our other species.

899. (7.) *S. congesta* (Hook. et Arn.); glabriuscula, caule suffruticoso inferne denudato, foliis densis obovato - lanceolatis subintegerrimis crassiusculis obsolete trinerviis, corymbo sessili multifloro congesto, pappo multiaristato corollam æquante. — Maldonado, and high grounds of the Rio Jacquery,

Tweedie.—This species is remarkable for its dense foliage, and crowded sessile corymbs of flowers. The leaflets of the involucre are also singularly obtuse.

900. (8.) *S. hirsuta* (Hook. et Arn.); pilis longis crispatis hirsuta, foliis densis lanceolatis crassiusculis subtrinerviis crenato-serratis, corymbis densis multifloris, pappo multiaristato corollam excedente.—Buenos Ayres and Banda Orientale, *Tweedie.*—In this the leaves are distinctly serrated, and the calycine leaflets are acute.

901. (9.) *S. tenuis* (Hook. et Arn.); caule tenui pubescenti-hirsuto, foliis rhombeo-ovatis trinerviis membranaceis glabris breviter petiolatis grosse serratis, corymbis paucifloris laxis, involucri foliolis acutis glabriusculis, pappo multiaristato corollæ vix longitudine.—Rio Grande, *Tweedie.*—This is quite an herbaceous plant; the two preceding ones are suffruticose.

902. (10.) Ageratum *conyzoides*, L.—St. Catharine, S. Brazil, and woods of Rio Saladillo, *Tweedie* (*n.* 1248).

Sub-trib. III.—Eupatorieæ. *Less.*

* *Involucri multiflori foliolis plurimis.*

903. (1.) Eupatorium *squarrulosum* (Hook. et. Arn.); hirsuto-tomentosum, foliis oppositis ovatis grosse serratis trinerviis, corymbis terminalibus densis, involucri cylindracei foliolis ovatis arcte imbricatis ciliatis striatis apicibus tomentosis obtusis squarrosis, flosculis numerosis vix involucrum excedentibus.—β. foliis latioribus obtusis minus pubescentibus.—Banda Orientale to the Rio Grande do Sul, *Tweedie. M. Isabelle.*

904. (2.) *E. hirsutum* (Hook. et Arn.); pilis laxis articulatis crispatis hirsutum, foliis oppositis brevissime petiolatis cordato-ovatis subacuminatis grosse inciso-serratis trinerviis reticulatis supra scabris, corymbis terminalibus densis, involucris brevi-cylindraceis, foliolis ovatis subarcte imbricatis striatis nitidis, apicibus obtusis erectis pilosis, capitulis glomeratis.—β. pilis foliorum rarioribus, pedunculis elongatis.—Banda Orientale and Rio Grande do Sul, *Tweedie.*—Habit of *E. ageratoides*; but the involucre is quite different, formed of broad, blunt, rather compactly imbricated, striated scales, densely hairy at their apices. The hairs on the leaves, and stem, and peduncles are long, patent, crisped, copiously jointed; those of the upper side of the leaf, especially near the margin, set on a little bulb or tubercle, which occasions a roughness that is wanting on the underside. In the var. β. the leaves are less hairy and narrower (but equally rough), and the peduncles of the partial corymbs are considerably elongated. In the only specimens we possess, the leaves too are alternate, but they are probably only flowering branches.

905. (3.) *E. bracteatum* (Hook. et Arn.); pubescenti-scabrum, foliis oppositis subsessilibus cordatis crassiusculis crenato-serratis rugosis trinerviis subtus tomentosis venis reticulatis prominentibus, corymbis densis, involucris subcylindraceis basi insigniter longeque attenuatis in pedicellos arcte bracteatos, foliolis ovatis obtusis striatis apicibus erectis tomentosis, capitulis multifloris.—Banda Orientale, *Tweedie.*—This is remarkable for the closely imbricated scales of the pedicels, gradually becoming larger and insensibly, as it were, passing into the scales of the involucre. There is an odorous resin which exudes and concretes on the branches of this plant.

906. (4.) *E. congestum* (Hook. et. Arn.); pubescenti-scabrum, foliis oppositis subsessilibus cordato-ovatis crassiusculis crenato-serratis rugosis trinerviis subtus tomentosis venis reticulatis prominentibus, corymbis parvis densis, involucris brevi-cylindraceis basi obtusis sessilibus, foliolis ovatis obtusis striatis apicibus erectis pubescenti-tomentosis, capitulis glomeratis multifloris.—Banda Orientale, *Tweedie.*—In size and foliage this is nearly allied to the preceding.

907. (5.) *E. subhastatum* (Hook. et Arn.); pubescenti-scabrum, foliis alternis oppositisque plerumque erectis subhastato-lanceolatis ovatisque brevi-acuminatis grosse serratis sessilibus subtus præcipue rugosis tomentosis, corymbis densis, involucris brevi-cylindraceis, foliolis ovatis obtusis striatis apicibus erectis pubescentibus, capitulis glomeratis multifloris.—E. teucriifolium, *Don, MSS.* (*non Willd.*).—Mendoza, *Dr. Gillies.* From Buenos Ayres to Rio Grande do Sul, and at Cordova, *Tweedie. M. Isabelle.*

908. (6.) *E. concinnum* (Hook. et Arn.); pubescenti-hirsutum, foliis oppositis lanceolatis acutis subpetiolatis trinerviis inciso-serratis subtus impresso-punctatis, corymbis laxis, involucri cylindracei foliolis arcte imbricatis striatis exterio-

ribus minoribus ovatis acutis apice incrassatis pubescentibus, interioribus longioribus obtusissimis glaberrimis membranaceis albidis. — Banda Orientale and Rio Grande, *Tweedie.*

909. (7.) *E. affine* (Hook. et Arn.); pubescenti - hirsutum, foliis oppositis lanceolatis acuminatis inciso - serratis brevi - petiolatis trinerviis subtus impresso-punctatis, corymbis laxiusculis, involucri cylindracei foliolis arcte imbricatis striatis omnibus obtusis apice incrassatis pubescentibus.—Rio Grande, interior of Entro Rios, and woods of Tucuman and Cordova (*n.* 1778—1780), *Tweedie.*—Differing considerably in the involucre from the preceding, but much resembling it in the foliage.

910. (8.) *E. ellipticum* (Hook. et Arn.); glabriusculum, foliis oppositis elliptico-lanceolatis serratis trinerviis subtus impresso-punctatis, corymbis densis glomeratis, involucri brevi - cylindracei nitidi foliolis subarcte imbricatis striatis apicibus acutiusculis incrassatis subpubescentibus. — Rio Grande do Sul, *Tweedie.*

911. (9.) *E. conyzoides ?* glabrum, foliis oppositis rhombeo - ovatis acuminatis petiolatis subcoriaceis inciso - serratis trinerviis reticulatis marginibus tenui-reflexis subtus obscure impresso-punctatis, corymbis laxis, involucri cylindracei foliolis arcte imbricatis ovatis obtusis striatis glabris, capitulis pedicellatis multifloris. — E. conyzoides, *Vahl.* — Banda Orientale, *Tweedie.* — We possess the same species from Rio, with rather narrower leaves; but whether it be the *E. conyzoides* of Vahl, we are unable to satisfy ourselves.

912. (10.) *E. ciliatum* (Hook. et Arn.); foliis oppositis ovatis petiolatis membranaceis utrinque acuminatis trinerviis reticulatis remote serratis supra glabriusculis subtus pubescentibus impunctatis, corymbis laxis, involucri cylindracei foliolis arcte imbricatis ovatis obtusis striatis glabris marginibus ciliatis, capitulis pedicellatis multifloris. — Buenos Ayres, *Tweedie.* — Allied to the last, but quite different in its foliage, and in the beautifully ciliated leaflets to the involucre.

913. (11.) *E. pedunculosum* (Hook. et Arn.); pubescenti-hirsutum, foliis oppositis ovato-lanceolatis trinerviis obtusis subtus tomentosis impresso-punctatis, paniculis foliosis laxis, involucri cylindracei foliolis arcte imbricatis ovatis obtusis striatis glabris marginibus ciliatis, capitulis sublonge pedicellatis multifloris.—Rio Grande do Sul, *Tweedie.* —Leaves smaller than the last, more rigid, and more downy; and the inflorescence considerably different.

*** Involucri subpauciflori foliolis paucis.*

914. (12.) *E. læte-virens* (Hook. et Arn.); ramosum, glabrum, foliis oppositis lanceolatis utrinque acuminatis grosse acute serratis brevissime petiolatis subtus pallidioribus reticulatis, capitulis glomeratim corymbosis, pedunculis pubescentibus, involucri foliolis linearibus apicibus diaphanis obtusis ciliatis. — Porto Alegre, Rio Grande do Sul, &c., S. Brazil, *Tweedie.*

915. (13.) *E. paradoxum* (Hook. et Arn.); fruticosum, glabriusculum, ramis elongatis erectis, foliis numerosis fasciculatis lineari - lanceolatis inciso - pinnatifidis, panicula elongata densissima foliosa, capitulis parvis, involucri foliolis laxis uniserialibus linearibus acutis, styli ramis clavatis glabris.—Valparaiso, *Dr. Gillies; Bridges* (*n.* 52.); *Cuming* (*n.* 337.)—This is a very peculiar plant, and cannot be confounded with any other species of the genus. The achenium is black; the pappus rough.

916. (14.) *E. buniifolium* (Hook. et Arn.); fruticosum, glaberrimum, foliis decomposito-pinnatifidis, laciniis linearibus, panicula elongata densa foliosa, capitulis cylindraceis, involucri foliolis acutis, styli ramis longissimis.—Woods of Tucuman, rare, *Tweedie* (*n.* 1128). — Inflorescence somewhat resembling the preceding; but the leaves more like the following.

917. (15.) *E. ceratophyllum* (Hook. et Arn.); fruticosum, pubescens, foliis decomposito-pinnatifidis, laciniis linearibus, cymis densis globosis, capitulis ovatis, involucri foliolis obtusissimis albis tomentosis. — Saladillo of Diego Ruiz, and woods and fields of Cordova, in vast abundance, *Tweedie* (*n.* 1232, 1292, 1291).—Flowers pink (*Tweedie*), appearing white when dry.

918. (16.) *E. decipiens* (Hook. et Arn.); fruticosum, tenui-pubescens, foliis dense fasciculatis ovato-rhombeis subcarnosis crenatis, panicula elongata densissime foliosa, involucri uniserialis foliolis brevibus linearibus obtusis pubescentibus, styli ramis clavatis.—Coquimbo, *Macrae; Cuming* (*n.* 907, *not in fl.*)—A no less remarkable species than the three preceding; in its inflorescence approaching nearest to *E. paradoxum.* Achenia brown, angled; pappus tawny.

919. (17.) *E. virgatum* (Don MSS.); fruticosum glabrum, ramis erectis, foliis rigidis linearibus integris pinnatifidisque, paniculis laxis foliosis, pedunculis pedicellisque gracilibus, involucris oblongis pluriserialibus 5—6-floris foliolis oblongis imbricatis subnitidis glaberrimis. —Mendoza, valleys near Villa Vicenzia, Aquadita, Province of St. Luis, *Dr. Gillies*; called Chilca by the natives. Uraguay, *Tweedie*.

920. (18.) *E. tremulum* (Hook. et Arn.); fruticosum glabrum, foliis oppositis lanceolatis trinerviis reticulatis brevi-petiolatis acute serratis subtus punctatis, panicula laxa, pedunculis pedicellisque gracilibus, involucris oblongis subpluriserialibus 5—6-floris foliolis oblongis imbricatis subnitidis glaberrimis. — α. foliis anguste lineari-acuminatis. — Buenos Ayres and shores of the Parano, *Tweedie*.—β. foliis latioribus subellipticis.—Coast of Lagoa, *Tweedie*.

921. (19.) *E. fulvum* (Hook. et Arn.); herbaceum glabrum, ramis flexuosis angulatis, foliis oppositis brevi-petiolatis obtusis inciso-serratis, panicula subcorymbosa, pedunculis pedicellisque pubescentibus, involucri foliolis subuniserialibus lineari-oblongis striatis glabris, pappo fulvo.—Rio Grande, *Tweedie*.

922. (20.) *E. elongatum* (Hook. et Arn.); herbaceum glabrum, foliis oppositis v. alternis lanceolatis oblongis obovatisve integris vel irregulariter serratis in petiolum brevem attenuatis obtusis 3-nerviis subtus minute impresso-punctatis, corymbis densis, ramis valde elongatis subaphyllis terminantibus, pedunculis pedicellisque pubescentibus, involucri glabri foliolis subbi-triserialibus exterioribus parvis pubescentibus interioribus linearibus glaberrimis. — Rio Grande do Sul, and woods of Lagoa, S. Brazil, *Tweedie*.—This appears to be a tall-growing species, with very long, almost naked branches, which bear the rather small but dense corymb of flowers.

923. (21.) *E. Nummularia* (Hook. et Arn.); suffruticosum, ramis pedunculisque pubescentibus, foliis oppositis orbicularibus elevatis sessilibus, basi cordatis coriaceis glabris subquinquenerviis, corymbo denso, involucri glabri ovati foliolis subbi-triserialibus exterioribus parvis acutis interioribus oblongis obtusis apice ciliatis. — Rio Grande, *Tweedie*.—A very distinct and well marked species.

924. (22.) *E. viscidum* (Hook. et Arn.); suffruticosum viscidi-pubescens, foliis oppositis ovatis acuminatis membranaceis trinerviis serratis sublonge petiolatis, subtus nervis vix elevatis minute reticulatis, corymbis densis, involucri glaberrimi subcylindracei foliolis submultiserialibus striatis ovatis internis oblongis obtusis.—El Aquadita, province of San Luis, *Dr. Gillies*.—Leaves 3—4 inches long, including the petiole. The species is allied to the following, but very distinct.

925. (23.) *E. reticulatum*, Hook. et Arn. *in Bot. of Beech. Voy. v.* 1. *p.* 29.—Valparaiso, *Menzies*; *Bridges* (*n.* 192); *Cuming* (*n.* 650); *Mr. Cruckshanks*. Quintero, *Dr. Gillies*. Coquimbo, *Macrae*.—In this the leaves are penninerved; very strongly reticulated, like those of the Sage; the veins on the underside very prominent. The hair of the pappus is a little dilated at the base. Leaflets of the involucre all acute, purple.

926. (24.) *E. acuminatum* (Hook. et Arn.); suffruticosum, ramis angulatis, petiolis pedunculis pedicellisque pubescentibus, foliis oppositis brevi-petiolatis lanceolatis longe acuminatis glabris penninerviis serratis, subtus pallidioribus obscure reticulatis venis vix elevatis, corymbo denso, involucri glabri subcylindracei foliolis subpluriserialibus obtusis, infimis elongatis minute erosociliatis.—Rio Grande, *Tweedie*.—Habit of *E. reticulatum*, but different in the leaves and involucres.

927. (25.) *E. Paranense* (Hook. et Arn.); suffruticosum, ramis pedunculis pedicellisque dense pubescentibus, foliis petiolatis oppositis ovato-lanceolatis acuminatis subtrinerviis serratis supra scabris subtus pubescenti-tomentosis reticulatim venosis, corymbo denso, involucri pubescentis subcylindracei foliolis subpauciserialibus striatis obtusis, exterioribus ovatis minoribus, interioribus oblongis.—Marshes of the Parana, and about Buenos Ayres, *Tweedie*.

928. (26.) *E. pallidum* (Hook. et Arn.); fruticosum, ramis pedunculis pedicellisque incano-pubescentibus, foliis oppositis deltoideo-ovatis acutis serratis basi trinerviis supra glabriusculis subtus pubescenti-tomentosis, corymbo densissimo pallido, involucri subovalis tomentosi foliolis subpauciserialibus striatis obtusis, ext. ovatis, int. oblongis. — Uraguay, and Arroy del Medio of Cordova, (*n.* 1300), *Tweedie*. — β. foliis deltoideis. — Buenos Ayres and San

Isedro, *Tweedie*.—γ.? foliis lanceolatis.—Rio Grande, *Tweedie*.—Very fragrant.

929. (27.) *E.? patens* (Don MSS.); suffruticosum valde ramosum, pedunculis ramisque junioribus pubescentibus, foliis oppositis ovato-oblongis subtrinerviis inciso-pinnatifidis, capitulis glomeratis in ramis brevibus patentibus oppositis foliosis, involucri oblongi pubescentis foliolis pauciserialibus obtusiusculis substriatis.—El Aquadita, province of San Luis, *Dr. Gillies*. Rio Jersero and Rio Pitambalo, *Tweedie*.—An *Mikaniæ* species?

930. (28.) *E. Tweedieanum* (Hook. et Arn.); fruticosum parvum undique pubescens vel glabrum, ramis angulatis, foliis sublonge petiolatis oblongo-lanceolatis obtusis integerrimis vel subsinuatis, cymis densis glomeratis, involucri subhemisphærici pubescentis foliolis subpauciserialibus striatis obtusis, styli ramis clavatis.—Uruguay, Porto Alegre and Rio Grande, *Tweedie*.

931. (29.) *E. ligulæfolium* (Hook. et Arn.); fruticosum, ramis pedunculis pedicellisque pubescentibus, foliis crebris lineari-ligulatis uninerviis patentibus subcarnosis punctatis farinosis farina decidua, corymbo denso ramosissimo, involucri dense pubescentis subovalis foliolis obtusis.—Rio Grande and Jacquery, *Tweedie*. A most distinct and peculiar species.

932. (30.) *E. spathulatum* (Hook. et Arn.); suffruticosum, foliis numerosis alternis (minoribusque axillaribus), spathulatis integerrimis utrinque albo-tomentosis, corymbis terminalibus foliosis, capitulis glomeratis, involucri albo-tomentosi foliolis oblongis obtusis, pappo purpureo-fusco.—Rio Grande.—*M. Isabelle*.—Remarkable for the numerous, spathulate, white, woolly leaves.

933. (31.) *E.? calyculatum* (Hook. et Arn.); fruticosum superne dense pubescenti-hirsutum, foliis subfasciculatis linearibus acutis subcarnosis glabris uninerviis impresso-punctatis glabris, corymbo laxiusculo, capitulis subglomeratis, involucri tomentosi foliolis laxis pauci-serialibus lanceolatis acuminatis longitudine æqualibus, pappo basi latiori subpaleaceo.—Sandy places at Maldonado and Monte Video, frequent, *Tweedie*.—The large acuminated nearly equal leaflets of the involucre give a very remarkable appearance to this plant, which may perhaps constitute a distinct genus.

934. (32.) *E. lanigerum* (Hook. et Arn.); herbaceum? pubescenti-hirtum, foliis alternis rhombeo-ovatis lanceolatisve acutis grosse serratis basi in petiolum alatum longe attenuatis trinerviis subtus magis hirsutis, corymbo denso, capitulis glomeratis, involucri pubescentis hemisphærici foliolis pauciserialibus lineari-oblongis apicibus obtusis dense lanatis.—Rio Grande and Cordova, *Tweedie* (*n.* 1298). β. *minor*; foliis angustioribus. Cordova (*n.* 1298 and 1281), *Tweedie*.—Allied in general appearance to the N. American *E. teucriifolium*, but the leaves and involucre are considerably different.

935. (33.) *E. trisectum* (Hook et Arn.); herbaceum elatum pubescens, foliis oppositis ternatim sectis segmentis ovato-acuminatis inciso-serratis supremis minoribus subintegris, corymbo denso, capitulis glomeratis, involucri ovalis glabriusculi foliolis pauciserialibus obtusissimis membranaceis obsolete striatis.—Valparaiso, *Bridges*.—Of this most distinct species we have only once received a specimen, and that unaccompanied by any number.

936. (34.) *E. tanacetifolium* (Gill. MSS.); herbaceum elatum hirsuto-scabriusculum, foliis bipinnatifidis incisis inferne in petiolum alatum longe attenuatis, laciniis lato-oblongis, corymbis dense glomeratis, involucri pubescentis hemisphærici foliolis pauciserialibus cuneatis (!) apicibus dilatatis diaphanis.—E. subplumosum, *Don, MSS.*—El Rio Quarto, province of Cordova, *Dr. Gillies*. *Tweedie* (*n.* 1297)—Banda Orientale, *Tweedie*.

937. (35.) *E. scandens* (Link. not Linn.); scandens herbaceum, caule pedunculis pedicellisque pubescentibus, foliis oppositis sublonge petiolatis cordatis serratis glabris basi triplinerviis, corymbo denso, involucri pauciflori subuniserialis foliolis oblongis acutis viridibus dorso pubescentibus, pappo fulvo.—Lago de los Patos, S. Brazil, *Tweedie*, who describes it as a coarse climbing herbaceous plant. The leaves can scarcely be called "reniform," otherwise it would agree pretty well with the very imperfect character of *E. scandens*, Link, given in Sprengel, and of which the native country is unknown.—β. foliis hastato-cordatis.—Marshy woods of the Parana, *Tweedie*. Both the states of this plant (if indeed they be varieties), but especially the β. may with equal propriety be referred to *Mikania*.

938. (36.) *E. populifolium* (Hook. et

Arn.); herbaceum pubescenti-glandulosum, foliis oppositis longe petiolatis cordatis crenato-serratis, corymbo denso, involucri hemisphærici foliolis pauciserialibus acuminatis striatis intimis appendicibus pulcherrime lanosis coloratis. —Banda Orientale and Pampas of Buenos Ayres, St. Jago, and Tucuman (*n.* 1299.) *Tweedie.*—The large poplar-shaped leaves, and singular woolly appendages at the extremity of the inner leaflets of the involucre of a delicate purplish rose-colour, rarely white, will readily distinguish this species.

939. (37.) *E. Candolleanum* (Hook. et Arn.); herbaceum elatum pubescens, caule angulato, foliis oppositis longe petiolatis ovatis lanceolatis subhastatisve crenatis obtusis v. acuminatis subtrinerviis, cymis densis capitulis glomeratis, involucri pubescenti-hispidi hemisphærici foliolis pauciserialibus multifloris omnibus acuminatis.—Woods on the Uraguay, Rio Jacquery, Rio Grande, &c. in S. Brazil, frequent, and very variable, *Tweedie.*

940. (38.) *E. glechonophyllum*, Less. *in Linnæa, v.* 6. *p.* 105.—E. ageratoides? *Hook. et Arn. in Bot. of Beech. Voy.* (not *Linn.*). Valparaiso, *Mr. Menzies. Chamisso* (in *Herb. nostr.*). *Mr. Cruckshanks, Mr. Graham, Bridges* (*n.* 193). *Cuming* (*n.* 652 and 330). *Lay and Collie.* Araucania, *Capt. Reynolds* (*n.* 18).—β. minor. *E. gracile, Don, MSS.* (not *Kunth.*). Pampas of Buenos Ayres, *Dr. Gillies.*—This species has many points in common with *E. ageratoides*; but it is shrubby at the base, the leaves are smaller and thinner, and their petioles extremely slender. The flowers are very similar.

941. (39.) *E. sulcatum* (Hook. et Arn.); herbaceum glabrum, caule ramisque sulcatis nitidis crassiusculis, foliis oppositis breve petiolatis lanceolatis trinerviis, corymbis densis, involucri subcylindracei subuniserialis foliolis lineari-lanceolatis acutis, pappo fulvo.—S. Brazil. *Tweedie.*

942. (40.) *E. Donianum* (Hook. et Arn.); hispidum herbaceum elatum, foliis remotis lanceolatis inciso-serratis integerrimisque, capitulis corymbosis magnis, involucri pubescenti-hispidi hemisphærici foliolis sub-3—4-serialibus ovato-lanceolatis acutis subæqualibus, pappo fulvo, styli ramis longissimis petaloideis. —E. macrocephalum, *Don, MSS.* (not *Less.?*).—Leptostelma Donianum, *Gill. MSS.*—Melinquecito, Pampas of Buenos Ayres, *Dr. Gillies.* Maldonado and Rio Grande and Cordova (*n.* 1106). *Tweedie.*—β. corymbis paucifloris, S. Brazil, *Tweedie.*—Lessing's *E. macrocephalum* is a Mexican plant; but he observes in a note, that the same species has been discovered in Brazil, by Sellow and Beyrich; so that notwithstanding some discrepancies in the description, our plant may be the same.—Lower leaves broader and deeply serrated, according to Mr. Tweedie.

943. (41.) *E. rufidulum* (Hook. et Arn.); herbaceum elatum superne caule ramisque ubique pilis ferrugineis crispatis tectum, foliis oppositis late ovatis subsessilibus grosse crenato-serratis, subtrinerviis glabris (nervis subtus exceptis), capitulis magnis glomeratis subumbellatis, involucri hemisphærici glabri foliolis subpauciserialibus ovato-ellipticis lævibus, pappo albo.—Rio Grande do Sul, *Tweedie.*—Allied to the last, but considerably different in the leaves and pubescence, and in the colour of the pappus.

944. (1.) *Mikania sericea* (Hook. et Arn.); scandens, foliis lato-lanceolatis acuminatis integerrimis petiolatis supra scabris densissime strigoso-sericeis, panicula subcymosa.—St. Catharine, S. Brazil, *Tweedie.*

945. (2.) *M. periplocifolia* (Hook. et Arn.); scandens pubescens, foliis profunde subsagittato-cordatis acuminatis angulatis, cymis glomeratis, pedunculo longitudine foliorum.—Marshes about Buenos Ayres and Rio Grande, *Tweedie.*

946. (3.) *M. scandens*, Willd.—Buenos Ayres, *Tweedie.*—β. cymis diphyllis, foliis angulato-serratis. Rio Jersero and Rio Pitambalo (*n.* 1285).—γ. foliis integerrimis, pappo breviori.—Woods of Tucuman, *Tweedie* (1188). An species distincta? *Tweedie.*

947. (4.) *M. pubescens*, Nutt.—Hedges of Tucuman (*n.* 1287). *Tweedie.*—This scarcely differs from var. β. of our *M. scandens*, except in the very downy leaves, especially their under side.

948. (5.) *M. glomerata*, Spr. Syst. Veg. v. 3. p. 421.—St. Catharine, Brazil, *Tweedie.*

949. (6.) *M. involucrata* (Hook. et Arn.); scandens, glabra, foliis cordatis acutis integerrimis, cymis pedunculatis, capitulis glomeratis bracteis magnis ovalibus membranaceis, pappo fulvo.—St. Catharine, S. Brazil, *Tweedie.*—The flowers are here entirely concealed by the large involucrated bracteæ. Pappus in a double row.

950. (7.) *M. subcrenata* (Hook. et Arn.); scandens, glaberrima, foliis subcoriaceis

cordatis acutis vel brevi-acuminatis subcoriaceis 5-nerviis sinu profundo lobis rotundatis crenato-repandis, cymis longe pedunculatis subpaniculatis aphyllis, involucro oblongo glabro.—Woods of Tucuman, *Tweedie* (*n.* 1189).—This is probably a recorded species; but all of the genus are so imperfectly described, that we cannot satisfactorily refer it to any. We possess the same, or a closely allied species, from Trinidad. It is common about Tucuman; where, with other species, it is called *Barba del Monte, Tw.*

951. (8.) *M. urticæfolia* (Hook. et Arn.); scandens piloso-hispida, foliis ovatis acuminatis incisi-serratis nervis subtus hispidissimis, corymbis densis, pedunculis foliosis, involucro cylindraceo.—Woods of Tucuman, and also cultivated in the gardens, on account of its agreeable scent, the flowers smelling like a well-ripened Peach, *Tweedie* (*n.* 1286).—Flowers large, crowded. Pappus tawny.

952. (9.) M.? *trinervis* (Hook. et Arn.); scandens, glaberrima, foliis elliptico-ovatis obtusis petiolatis trinerviis integerrimis, paniculis laxis terminalibus, pappo e pilis clavatis serrulatis.—St. Catharine, S. Brazil, *Tweedie.*

Sub-trib. IV.—Tussilagineæ. *Less.*

953. (1.) Adenocaulon *Chilense.* Poep. —*Less. in Linnæa, v.* 6. *p.* 107.—Shady woods in the Andes, province of Valdivia. *Bridges* (*n.* 573).

ON THE CASCARILLAS OF CUCHERO AND HUANUCO.

(Extracted from Dr. Poeppig's "Reise in Chili, Peru, und auf dem Amazonenstrome.")

Next in order and importance to the *Coca*,[1] the Fever Bark (*Cascarilla*) claims a place, as being the cause of the colonization of Chinchao's and Cuchero's wild and forest-covered mountains. The introduction of the very lucrative traffic commenced about 1785; for notwithstanding the high price that the bark fetched at Loxa, no one, for years, thought of pursuing a similar profitable trade in the well-known *Cinchona* of Huanuco. Shortly, however, after its commencement, the original proprietors, who were active Spaniards from the old country, became so wealthy, that they found numerous imitators, who not being possessed of land, were obliged to make distant excursions, partly in the wild woods on the other side the river, within reach of the independent Indian people, and partly in the humid and hot forests of the Lower Missions (at Chicoplayo and Pampa hermosa) where they found an inferior but more easily attainable kind of bark. These poor and unprincipled speculators, less interested in the real welfare of the trade than those individuals who possessed large Cinchona woods of their own (at Cuchero, Pillao, and Cassapi), were guilty of great deception, and frequently sold an adulterated and inferior article. Various kinds of *Fever barks* came into the market from the provinces north of Huanuco, under the name of the true Huanuco bark; and thus the purchasers in Europe became distrustful of them, and declared them to be of indifferent quality, a character which they by no means deserve; my experiments on numerous kinds which I have collected and compared, proving them to possess, in the highest degree, all the medicinal virtues of this tribe. At the breaking out of the Revolution, when the union with the mother-country was long interrupted, the emigration of many of these proprietors, and the want of capital in others, proved highly detrimental to the trade in bark: no new individuals came forward to support the commerce with Spain and the few foreign merchants who resided at Lima were too ignorant of the nature of the business to venture upon making any extensive purchases. Thus the produce at Huanuco accumulated upon the owners' hands to their great loss, and the old and experienced bark-collectors having dispersed for want of employment, the trade has fallen into abeyance ever since the year 1815. Many have been the endeavours made by the present proprietors of Cassapi, Cuchero, and Pampayaco, to revive a business which promises to be so profitable to themselves, for the rest of fifteen years which the trees have enjoyed, has caused them to grow so

[1] See p. 161 of this Journal.

luxuriantly, that it is expected the first year's produce might, with great ease, amount to 12,000 arrobas (in value about 60,000 pes. dur.). During the war, the bark obtained from the yungas or moderately elevated mountain-forests of Bolivia, became an article of commerce, finding its way into Europe by Arica. It is called *Calisaya*, an erroneous name, destitute of any meaning, and which ought to be spelt *Collisalla*, as its etymology is "*Colla*," which signifies *remedy*, and "*Salla*," *rocky ground*. Like the *Cinchona* of the lower Peruvian provinces, the Bolivian tree affects the stony hills, and there exclusively produces a good and powerful bark. Perhaps it is the accession of foreign capital, and not the superior quality of the article itself, which induces the merchants of Lima, many of whom are mainly dependent on Arica, to recommend and patronize exclusively the *Calisaya*, while they refuse to vend the bark of Huanuco. It is impossible at present to obtain an accurate account of the number of arrobas of the latter, which in more prosperous times used to be transmitted to Lima, as much of it was purchased by small and inferior speculators, who declined any connexion with the large proprietors at Huanuco. Some old citizens of that place, who were indebted to the bark trade for their wealth, have stated to me that about 24,000 arrobas (of 25 Spanish lbs.), may have been exported from the province in the best years; and that estimable person, Don José Espinosa, who formerly occupied the first rank in this class, adds, that the speculators, who, possessing no landed property, rambled in the woods to collect the article, seldom obtained more than 300 or 400 arrobas each; whilst the proprietors of large haciendas, who, naturally enough, permitted no stranger to fell and strip the *Cinchonas* in their woods, frequently accumulated, according to the size of their districts, from 2,000 to 3,000 arrobas apiece. Cuchero can boast of the greatest abundance of these trees, and one of its former proprietors, Don José Bidurrezaga, was enabled to procure from his woods, 6,000 arrobas, which, at the common price, produced more than 90,000 pes. dur. At present this trade may be considered extinct in the province of Huanuco, for scarcely 50 arrobas find their way to Lima, in small quantities, and are there used for mixing with the inferior Bolivian sorts, or added to improve the flavour of the best Truxillo kinds, which occur in very small quantities in commerce, and may be considered as the very worst article of all.

When the great haciendas were searched for the Fever Bark, the business was conducted systematically, as it might have been in the forests of Europe. The first point was to obtain an accurate knowledge of the place, by separating the whole into different departments. Remote excursions were not undertaken, as the workmen always saw the buildings of the hacienda so near as to enable them to return within a few hours; and the whole employment was only pursued occasionally. The manner of proceeding was altogether different when the speculator, who had no land of his own, was obliged to search for bark on the high mountains on the other side of the Huallaga, and at the sources of Tulumayo. The people employed were individuals residing near the Cinchona districts, who, being much too proud for daily agricultural toil, assume to themselves the title of Cascarilleros, or bark-collectors; and considering themselves to belong to a much higher station than the peon, or day labourer, claim privileges above the latter, and make their own terms with the manager of a party. A contract is generally entered into, and the Cascarillero receives, in conformity with a system equally disadvantageous to both parties, and only to be explained from the scantiness of the population, a credit of sixty to one hundred pes., which he gambles away generally in brandy, seldom taking useful articles in return. The very best provisions and implements are also provided at the expense of the person who engages the party; and the company, consisting of ten or more individuals, then start, well armed, for the forest, pressing forwards on foot, and en-

countering very great obstructions in those districts where no one can claim the land as their own, and where the bark-trees are abundant. There they erect some very simple huts, and engage also a number of common day-labourers, besides the proper Cascarilleros, partly to enable them to level the rough ground over the excessively stony mountains on which the bark is conveyed from the forest, and partly to supply them, from time to time, with needful provisions. Not satisfied with those trees which stand singly, the produce of which, indeed, would hardly repay the heavy expense incurred, the Cascarilleros eagerly look out for the groups (*manchas*), where the *Cinchonas* are found growing together. For this purpose they either ascend the top of a high rock or lofty tree, experience, and a sharp sight, enabling them to detect the clusters of *Cinchonas* at a great distance by their dark hue; and, on sunny days, by the reflection of light from their leaves, which shine very conspicuously even far in the heart of these interminable forests. The Indian, with unerring instinct, now constitutes himself the leader of the whites, and leads them for many leagues through the forests, to the desired groupe of *Cinchonas;* though, perhaps, at every step it has been necessary to clear the way with the forest axe. When a portion of the trees have been stripped of their bark, which, in a successful year, would amount to fifty arrobas from a single cluster of *Cinchonas*, the whole quantity is divided into bundles, weighing, in the moist state, about three arrobas each, and laid on the backs of the Indians; who, thus loaded, wind their way through the trackless forests, and arrive in a surprisingly short time at the nearest inhabited spot. There the proper inspector waits for them, to attend in person to the important business of drying the bark, which could not have been successfully performed in the shady forests. Every thing depends on the result of this operation; for the article that has once become mouldy, loses its colour, and no art can restore it so perfectly as to hide this damage from the eyes of the experienced purchaser. For each arroba thus delivered of the green bark, called *mato*, the undertaker places two reals to the account of the Cascarillero; but as in good and productive spots the industrious workman may easily strip off from eight to ten arrobas in a day, the profit to him amounts to more than two pesos. Undoubtedly, the individual who is at the head of such a company must possess a considerable capital; but then the advantage is more than proportionably large and certain: for, even then, the arroba of good bark, including its conveyance to Huanuco, fetched the very highest price of seven pesos, though being gathered at great distances, and on the wildest mountains, the difficulty of conveyance, on the backs of the Indians, added greatly to the expenses. To the proprietors of Cassapi and Cuchero, whose bark was gathered immediately close to their dwellings, and could be carried by mules, the arroba cost from three to four pesos; whilst its price, at Lima, was always from sixteen to twenty pesos. And though recent trials have proved that little more than twelve pesos would be got at Huanuco, yet the expenses are so much lessened by the fall in the price of all implements, aud the increase of labourers, yet there still must remain a considerable profit for the speculator. The value of goods in Lima has hitherto been somewhat variable, and continues subject, at the present time, to unlooked for fluctuations; still the contractor in the interior was little affected by such causes, a stipulation having been previously made for the price on delivery of his goods. Nor did the merchant, in Lima, suffer materially from the diminution of a few dollars in selling the bark; as even, when at the lowest, a clear profit always remained for him of several pesos on each arroba. It was only at great distances from the place of its growth, and in the hands of ignorant people, who were deceived by a bad article, imported from the warm vallies, or the Montaña Real, that the bark trade was a perilous speculation, and one which some-

times involved those who pursued it in very serious losses. Doubtless, a revival of the commerce in Huanuco bark would prove greatly advantageous to that province, and a constant supply in the market might thus be ensured, particularly if government, by instituting and enforcing such precautionary laws as have existed for upwards of a century in Loxa, would prevent the unprincipled adulteration of this valuable article by the petty collectors. A little circumspection on the part of the Cascarillero would prevent injury to the *Cinchona trees*, the final extirpation of which has been prognosticated by those individuals who are ignorant of the nature of the tree.[1] It is only needful to take the precaution of cutting down the stem close to the root to insure its springing up again. In the mild districts, as about Cuchero, this vegetative process takes place so rapidly that, in six years, the young stems may be felled again; while in the colder region of Puna and the Ceja forests, where the most powerful *Cinchona* grows, twenty years are required.

The Peruvians, though much visited by Endemic Tertian, are strongly prejudiced against the use of bark; and while its virtues were known in Europe, and appreciated even by the Indians, who dilated on them to Condamine, the white people at Quito, as well as those who were natives of the country, aver, that it is only in the colder northern regions that the exhibition of Cinchona bark can be useful. They class it among the heating kind of remedies (*Muy calientes*), and obstinately persist in an opinion derived, perhaps, from the old Arabic physicians, who, in Spain and Portugal, divided all medicines, food, and drinks, into the cold and hot kinds. Here, where "inflammation of the blood" is eminently dreaded, and the patient applies himself to thin his coagulated juices by all possible methods, it cannot be supposed that bark finds much favour, when, even in Europe, the admixture of Epsom salts is sometimes needful to correct the obstructions to which its injudicious use has given rise.

I may state, that having been severely attacked with Tertian fever, when at a distance from medical aid, and destitute of every other remedy, I used the green bark of the *Cinchona* with the happiest effect; stripping it freshly from the trunks which grew within a hundred yards distance. Though exhausted by the fatigues and privations incidental on a residence for eight months in the forest, I cured myself, at three different intervals, by the application of this unadulterated remedy, combined with copious doses of Epsom salts; and never could I again behold, without a feeling of gratitude and pleasure, the beneficent *Cinchonas*, whose noble reddish flowers appear in January, in such quantities as to render the tops of the trees conspicuous from a great distance.

[1] Ulloa (see Notic. Secret. p. 572) thought that the *Cinchonas* would soon be exterminated, and proposed, by legal methods, to prevent this evil. Condamine, in his *Mémoire sur l'Arbre du Quinquina*, entertains the same fear, and, perhaps, on just grounds, if the neighbourhood of Loxa were alone considered; for there they pursue a different method of obtaining the bark than in the province of Huanuco, baring the trunk as it stands instead of felling it. In all such cases, decay spreads in the tropical woods with incredible rapidity, and myriads of insects, which lodge in the dead trunk, accomplish speedily the destruction of its otherwise sound root. So great is the vital power in most tropical trees, that, unless every unfavorable cause seems leagued against it, the rapidity of after-growth will soon compensate for the injury that was inflicted, and the sound part throws off the injured portions; as in a healthy subject a wound is speedily and effectually healed. If the vegetation in these countries were not more vigorous than in the North, it must soon yield to the disproportionately greater causes of decay. The burned wood, in which the soil has been so heated that it is impossible for several days to walk there, speedily reassumes a verdant though varied aspect: the stones may have been calcined by the intensity of the flames, yet will the charred stems spring up again, to the astonishment of all beholders, and even become arrayed with such delicate plants as might well be supposed incapable of resuscitation after undergoing this literally fiery ordeal. Thus have I seen the most lovely *Orchideæ*, the *Tillandsias*, and a beautiful *Maxillaria (M. bicolor*, Fl. Peruv.*)*, growing on the ground, near Pampayuco, in large clumps, resembling the richest Mosaic pavement, and clothing the very soil over which the forest-fires had recently passed.

The Fever Bark of Cuchero, or Huanuco Bark of Commerce.

The principal districts of the bark collectors are situated on what is called the Montaña de Huanuco, that is in the woods, which, commencing near Ceja in the province of Guamalies, stretch eastward through the northern part of Huanuco, and especially abound in the Quebrado of Chinchao; also filling the valleys of the mountains of Muña, Acomayo, and Panataguas, and losing themselves probably near the Rio Pachitea. The Cascarilleros of Huanuco range through the eastern side of the Andes in that province, and skirting the Rio Monzon, reap a rich harvest in the valley of Huallaga, and in the extraordinarily deep valleys and defiles, such as the Quebradas of Chinchao and Cassapi, which every where intersect and divide the country in this direction. Beyond the bounds that I have stated, the Cinchona trees grow in such a shrubby state that their bark, though powerful in quality, is unsuited for the purposes of commerce; and to the north of the Huallaga again, where the valleys are close and warm, its virtues are so deteriorated, as either to be entirely rejected by the merchants in Lima, or to fetch only a very inferior price, as it is easily distinguishable from the true Huanuco bark. The same species of *Cinchona* is so much affected by a subalpine situation and warm temperature as to produce an entirely different bark, a fact which I have verified by numerous experiments. The habit of the tree, too, is materially changed. All this is quite contrary to the opinion of Condamine, who makes the extraordinary assertion that the barks of the warm districts are the most powerful, while he virtually contradicts himself by stating, a few pages farther on, that the *Cinchona* from Jaen de Bracomoros was so bad that its very name condemned and rendered it unsaleable in Panama. The environs of Jaen are very low, being stated by Humboldt as having about the same altitude and temperature as the lower Huallaga, and to this day its produce is considered of as inferior quality as what comes from Mayobamba, Chacapoyas, and Lamas. The small quantities of bark that are obtainable on the Jalcas, at considerable elevations, are sent to Truxillo, the natural port for the produce of this district, and bear a fair character, though the trade is only occasional. The bark from Mayobamba is very small, and gathered from the *Cascarilla loba*, which, even about Cuchero, possesses but little efficacy, and in the warmer atmosphere of Maynas is entirely inert. It was with these descriptions of bark that the cunning Peruvians deceived the rash and eager people from Brazil, who, who after having expelled the Spaniards, hoped to realize and possess some of the fabled treasures of Peru, by making extensive commercial enterprizes to Yurimagnas and Mayobamba. No wonder that the speculators of Para cursed the Peruvian bark trade (see Martius' Travels, vol. III. p. 1178.), for the article that I found lying unsold at Para was the very worst that could be sent from Peru. Even now, the ignorance and grasping disposition of the first Brazilian speculators are the subject of ridicule at Mayobamba; and in Yurimagnas many hundred-weight of bad bark still lies rotting, to the ruin of the Sub-Prefect of that province, who, having the first time shipped off a large cargo of this worthless article, hoped to have accomplished the deception again, with equal success. Barks from the territory of the Upper Huallaga have never found their way to the Brazils on the Marañon, for any communication between Cuchero and Tabatinga is impossible and never existed; besides which, the commerce in Huanuco had even ceased before the Brazilians had permission to come to Maynas. In the province of Para, even under the flourishing state of trade, there are strong prejudices against the sale of Peruvian fever bark, for the better kinds had never been sent there. Thus the produce of the Montaña of Huanuco has always been

transmitted to Lima, and thence to Europe by Cape Horn, and never took the imaginary way of the river Marañon.

In the Cinchona forests of Huanuco, the collectors were very attentive even to variations arising from locality. Thus they gathered the bark only from trees which grew on steep declivities or mountain-tops, rejecting the finest trunks that stood collected in promising groups, (manchas,) where the soil appeared moist and the air warm and deficient in proper ventillation. For this reason the price of the produce varied considerably even in small districts, that rind being most costly which was obtained from the coldest and most elevated spots. The provinces of Conchuros and Guamalies abound in forests of Cinchonas; near the villages of Cayambe and Pillao, and in Cuchero and Cassapi, and on the mountains of Panataguas and Pampayaco, the very best kinds are procured. That from Pozuzo is small and inferior; while the bark of the *Cascarilla hoja de Oliva*, which grows only in small quantities near San Rafael, is considered the finest of all. With the exception of some few haciendas, all the above-mentioned countries, which teem with Cinchona trees, belong to no individual in particular; and it is the same with the unappropriated wilds of the Huallaga, which are uninhabited, and protected by no fort or government defence. Every one has a right to collect there, and it does not seem as if a single regulation of any kind existed with reference to the Cascarillas.

In the month of April the preparations for an expedition commence, and in May the people start for the forest, whence the last green bales are transmitted home in November. They fell the tree close to the root, sparing those trunks which appear too young (*palos verdes*), as, till they have attained maturity, the bark is of no value. The next process is to divide (*trozar*) the stems into pieces of uniform length, rejecting only the very smallest branches. With a peculiar kind of knife, made for the purpose, the bark is cut lengthwise, and a certain degree of practice is necessary to perform this operation properly, so as to remove the rind without injuring the wood or severing any of the fibres. With the same instrument they take off the stripes (*lonjos*) of the bark, as broad as possible, but this, however, is not done for three or four days after the tree is felled, as, before that time, the moisture that exists between the cuticle and the wood would prevent the bark from severing into such large pieces as fetch the highest price. A worse consequence ensues from stripping the stems off too quickly, as then the thin grey or blackish epidermis shivers off, and from the presence of this outward rind, covered with many Cryptogamia, the value of the bark, in the European market, is mainly estimated. The English purchasers in particular, held the notion that the bark was most powerful according as its epidermis was covered with spots.

On the celerity with which the article is dried depends the price which it commands; but there are few instances where prejudice is so powerful as in the trade of the Cinchonas. In the dense forests it is impossible to perform this operation properly, and therefore the bundles of green bark are despatched, with all speed, to the nearest inhabited place, where the person appointed to take the charge of them is stationed. Without any preparation, they are laid in a spot exposed to the full action of the sun, the greatest care being requisite to protect them from wet, as even a few hours' dew falling on the half-dried bark will give to the cinnamon-brown interior of the finest sort a blackish appearance, and lessen its value about one half. The quickness of the drying, and the general excellence of the article are indicated by the pieces being rolled up into several spiral windings, which form so solid a cylinder as to exhibit no cavity (canuto) within: but such portions are rarely seen unfractured in Europe. The Cinchona Barks are no less sensible of atmospheric moisture than the Coca which I formerly described, so that the collectors always hasten to send them to the dry climate of

the Andes, or the principal towns. An unavoidable loss, however, hence accrues; for however perfectly the bark may have been dried in the woody region, it still loses in three or four days after its arrival in Huanuco, twelve to fifteen per cent. on its weight. The packages are made up into bales of four or five arrobas each, and with the greatest possible care, in order that the beautiful canes of two feet long, into which the bark was coiled on the Montaña, may not be broken in the carriage. Trailing plants *(bejucos)* are used to tie up the bundles, and when they arrive in Lima they are undone, and sorted into lengths of different pieces, previously to dispatching them in chests to Europe. The trade in Huanuco bark was very brisk twenty years ago at Lima, and the article went to the Spanish market under the name of *Cascarilla roxa,* without being confounded with the *Cortex Chinæ ruber* as it is called by us. The barks from the districts of the Lower Huallaga, of Huambo and Chachapoyas, &c. are on the other hand, very little prized in Cadiz, and called *Cascarilla arollada.*

As to the various species of trees that produce the barks, and the different qualities of the article itself, much prejudice prevails, not only in Europe, but also in Peru, as even Condamine, in his *Journal d'un Voyage à l'Equateur,* published at Paris in 1751, vol. i. p. 38, has noticed. Many species are entirely rejected, and others, without cause, considered peculiarly fine, and the Botanist sees, with surprise, how the natives, without any visible character, still separate the same well-marked species into numerous different ones, and give corresponding and different names to the produce. A single species, *Cinchona glandulifera,* of Ruiz and Pavon, has three appellations, though scarcely the least trace of a variety can be detected, on the strictest botanical examination. There is also an opinion prevalent in Peru, that it is only the bark of stems and lower branches which possesses medical virtues, and that the slender quills (canutillos) which were long sought for in preference by the English trade, are far less valuable in pharmacy.

With the hope of throwing light on the subject of the different kinds of Huanuco bark, and of ascertaining their botanical affinities, I have dried and prepared with the utmost care, a great quantity of these apparent or reputed species that grow about Pampayaco, having myself stripped off the barks, and after subjecting them to the proper process, sent large quantities of the several sorts to Europe. What I therefore here state is the result of my experiments in Peru, and of the comparisons which I have instituted respecting them since my return to Europe.

The *Officinal barks,* growing in the vicinity of Cuchero, are as follows:—

1. *Cascarilla Negrilla,* which is obtained from the *Cinchona glandulifera,* R. and P., is esteemed the finest kind. The tree inhabits only the higher mountains, and is scarcer than the other species: its trunk twelve to fifteen feet, and on the cold summits of the mountains attains only the stature of a bush; when it yields so little bark that only five or six pounds, on an average can be expected from a single tree. The Peruvians distinguish this bark by its generally blackish upper skin, which is only here and there interrupted by small grey-green spots when in a fresh state. The common people consider these appearances as an integral part of the bark, and look upon it as the more valuable, if beneath the larger spots there appears a black shining velvety substance, dispersed in ovals, of some lines broad (this probably arises from the presence of some species of *Byssus).* The quality of this bark is also attested, according to the statements of the Cascarilleros, by its exhibiting a glossy, shining, almost roziny fracture: its colour withinside should also be that of a ripe orange, with a light transition to a fiery brown. The *canutos* in this kind of bark are likewise much thinner and less woody than in the following. In the month of February the forests are perfumed with the strong scent of its blossoms.

2. *Cascarilla provinciana Negrilla.*

(*C. glanduliferæ*, R. & P. *varietas*). This is likewise a fine sort, and the produce of the same tree, of which the bark differs according to its different habitat. On the high mountains this species yields the *Cascarilla Negrilla* and the present sort in the warmer vallies. In external appearance these barks are much alike, the inside being of a less fiery and fainter colour, and more verging on cinnamon brown in the second kind. Neither for the European trade, nor in medical use, are these distinctions, however, of any importance.

3. *Cascarilla provinciana.* (*Cinchona micrantha.* R. & P. *Varietas.* α. flor. extus roseis. β. flor. extus albidis). The tree is of considerable circumference, it flowers in February, and frequently yields eight to ten arrobas of dry bark, which differs from that of Huanuco by the strikingly whitish colour and greater roughness of the surface. It is likewise thicker and more woody, the fracture is more fibrous, and the colour of a bright cinnamon brown. Three kinds are known in trade.

4. *Pata de Gallinazo.* This name is applied to the barks which are peeled from the young and upper branches of the foregoing species. Formerly the foreign merchants were prejudiced in its favor, and considered this as a fine sort, contrary to the opinion generally received in Peru. Probably the thinness and less woody texture of the rind, with the difficulty of procuring it in large quantities, occasioned the former idea. Its name, which signifies *Claw of the Black Vulture* (*Vultur Aura*, Linn.) arises from the blackish and radiated appearance caused by some species of *Graphis*, which generally grows upon it: the *Pata de Gallareta* mentioned by Ruiz and Pavon, is the produce of the *Cinchona ovata* of the *Flora Peruviana*, vol. ii. p. 52, which does not grow about Cuchero and differs from the present.

5. *Cascarilla hoja de Oliva.* (*Cinchona nitida*, R. et P.?) This kind of bark is only known in small quantities, and is not regularly collected. It resembles the finest kinds of Loxa bark, and excels them in the resinous and astringent flavour. The tree itself, which is unknown to me, grows only upon the coldest mountains, and is said to have a stem scarcely eight feet high, straight, and producing very little bark, but which is so highly esteemed that the viceroy and correjedores purchase it all, to send as presents to the king and the grandees of Spain, so that it is never seen in commerce. The flower is of a bright red, covered with a white tomentum withinside, and it expands in May. This latter circumstance coincides with a *Cinchona* which I found in April, 1830, on the Cuesta de Carpis, growing as a very small tree, the *Cinchona heterophylla*, (Ruiz,) a species distinguished by its pendent flowers, but which may perhaps prove only a variety of *C. pubescens*, Vahl, (*D. C. Prodr.* vol. iv. p. 353.)

6. *Cascarilla boba colorada.* (*Cinchona purpurea, R. and P.*)—A tree of considerable elevation and circumference, by which alone it might be discriminated from the allied species of *Cinchona*, as well as by its very large and membranaceous leaves, which are covered on the underside with broad, prominent, violet-coloured veins, that are so numerous in the young state as to give their own hue to the entire leaf. The bark, in a fresh state, is extremely bitter, and may probably be found useful for making cheap decoctions, as it can be sold at a very low price. It is not now universally collected, but formerly served for occasionally adulterating the better kinds; an imposition, however, that was easily detected. According to Göbel, it is not quite certain whether the *Cascarilla boba* is not also sometimes obtained from the *Cinchona cordifolia, Mute*, and the *C. macrocarpa*, Vahl.

7. *Corteza del Azahar.* (*Cinchona magnifolia, R. and P.*)—A very stately tree, with unusually large white flowers, diffusing a most delightful scent, like that of orange blossoms. To this bark is never applied the name of *Cascarilla*, that is, *Fever Bark*, in its strict sense, as the ignorant observer does not consider the

Azahar to be a *Cinchona*. It is like, except the stem, a young oak, with bark four or five lines thick, and woody; which, for the latter reason, does not roll itself into tubes, possesses little astringency, and is never gathered for sale: still it is said to be applied to officinal uses occasionally in Europe, and is mixed in small quantities for the purpose of adulteration with the finer kinds.

For the following observations on the above-mentioned barks, which, in Peru, are regarded as articles of commerce, I am indebted to M. Reichel, apothecary at Hohenstein, in Saxony, who himself possesses one of the richest collections of *Cinchona* in Germany, and has also compared my samples with those in the great collection (considered to be complete) of M. Von Bergen, in Hamburg.—"All the barks transmitted to me by M. Poeppig, appear to be peculiarly well preserved, and not at all chafed; they are also in large quantities, and unusually fresh-looking, so as to present a series of very instructive forms, which it was not easy at first sight to identify with the very shattered and rubbed articles which are generally seen in commerce.

"I. *Cascarilla negrilla*.—Of this kind there are most rich specimens, a foot long, and from one-half to three-fourths of an inch in diameter, nearly straight throughout, all doubly rolled; the outer surface very rough, covered with many oblique furrows; and the colour varying from slate to ash, and even reddish grey, clothed with many white Lichens and Cryptogamia; on the smooth inside are many tender fibres, and the colour is cinnamon. The bark is hard, its fracture nearly straight and resinous; the smell resembling tan, and musty; the taste an acid, astringent, and abiding bitter. The appearance, as well as other characters, and particularly a comparison with the original specimens of M. Bergan, leave no doubt that this bark is equal to the finest sort from Loxa. It formerly came, though rarely, and in small pieces, among the Lima barks. The decoction is of a peculiarly beautiful reddish yellow; and when tried with the tests of oxyde of iron, oxalic and emetic tartar, proves its quality to be the very best.

"II. *Cascarilla provinciana*: the *Huanuco bark* of commerce exactly corresponds with the bark so named in the Bergen collection: most of the pieces are a foot and a half to two feet long, and from three-fourths to an inch in diameter; every tube spiral, a character universally found in all the young barks from Huanuco; the external rind and alburnum firmly attached together; the outside abundantly covered with white spots and little Cryptogamia. The taste, which is at first acid, afterwards becomes a powerful and enduring bitter. The peculiar transverse chinks of the Huanuco bark exist here in great numbers. The decoction was a beautiful red brown; and when exhibited with the before-mentioned tests, proved the quality to be that of the inferior Loxa kind.

"III. *Pata de Gallinazo*. Evidently the bark of younger branches of the preceding, with which it eminently agrees. None of the specimens exceed a foot in length, and an inch in thickness, and their decoction resembles the last. This kind formed a small portion of the so-called 'Lima bark' of commerce.

"IV. *Cascarilla boba*; the *Huamala Bark* of Trade; existing in large quantities, but chiefly very young barks; on part of which the wart-like elevations were wanting. The peculiar longitudinal wrinkles which distinguish the Huamala bark above all others, abound here. In the younger specimens, the colour verges upon fawn-grey-white on the older samples, which are covered with numerous wart-like elevations, there are so many brown spots as to give the whole a peculiarly russet hue. All the portions are covered with white spots, but no perfect Lichen could be discerned, except small specimens of *Usnea Cinchonarum*. The canes are from one and a half to two and a quarter feet long, and from a quarter to one inch thick, with a slightly

acid taste, that after long chewing turns to a predominating bitter. After the decoction had cooled, its colour became like yellow loam, and tried with the former agents, displayed the same properties as the much-used, but very inferior China bark."

About Cuchero, the *Cinchona rosea* of Ruiz and Pavon occurs not unfrequently; it is a highly beautiful tree, which in its size and mode of ramification may be justly compared with the white Beech of Europe, adorned in July with innumerable pale violet flowers, and in its growth, circumference of stem, and great hardness of wood, differs greatly from all the other Cinchonas, the trunk seldom exceeding from six to twelve inches in diameter. Its name of *Palo de San Juan* refers to the flowering season. Of the bark no use is made, for no one supposes it to belong to the Cinchonas; but there can be little doubt that their peculiar properties would be found, on examination, to exist in the thin and smooth bark of its riper branches.

In the adulteration of the superior sorts of bark (a very common practice), the bark of the *Azahar*, described above, was chiefly employed. It however bore too much resemblance to Oak-bark, and was so heavy and easily distinguishable by its very sharp and disagreeably bitter flavour from the fine aromatic taste of the genuine kind, that the imposition could not prevail to a very great extent. The bark of the Lucumo, perhaps a species of *Achras* or *Cervantesia*, was similarly employed, but it had too foreign an appearance to be mixed in any great quantity, and the same may be said of the Lluto, a new species of *Clusia*, which is a beautiful tree, with large white flowers. By many, however, it has been denied that this latter bark is mixed with the Cinchonas.

Extracts of the bark were for a long time made on the spot, and generally sent to Spain; and in Loxa this business was carried on for more than a century, as stated by Condamine. After the decline of the Bark trade in Huanuco, an English merchant in Cuchero attempted to make money by preparing a large quantity of the extract; but his article met with a bad sale in England, where the Quinine was already extensively imported. Samples of it, however, that had been preserved in the damp primitive forests, by enclosure in leaden boxes, were examined by competent judges in Germany, and pronounced to be of excellent quality, and possessing an aroma very superior to the extract made in Europe from the dried bark.

The Cryptogamia on the barks of Cuchero, besides many undescribed species, are, 1. On Cascarilla provinciana—*Asterisca cinchonarum*, *Graphis subcurva*, *G. Cascarillæ*, and *G. byssiseda*; *Lecanora pallido-flava*, *Verrucaria parasema*, and of the larger lichens only the *Usnea cinchonarum*.—2. On Cascarilla Negrilla—*Lecanora punicea*, *Lecidea grisea*, *Verrucaria exasperata*, *Graphis sub-bifida*, *Variolaria microcephala*, and *Parmelia melanoleuca*.

DESCRIPTION OF MALAYAN PLANTS.

(Continued from p. 101.)

TABERNAEMONTANA MACROCARPA. *W. J.*

Foliis ovato-ellipticis basi attenuatis, corymbis terminalibus dichotomis, folliculis maximis subglobosis.

In the interior of Bencoolen.

A *Tree; branches* smooth, somewhat compressed in contrary directions between each pair of leaves. *Leaves* opposite, petiolate, from elliptic-ovate to elliptic-lanceolate, tapering to the base, broader above, with a short point, very entire, very smooth; *nerves* transverse, uniting into submarginal arches, ten to twelve inches long. *Petioles* embracing the stem, each uniting with the base of the opposite one: *Peduncles* three to four, terminal, dividing at their summits into dichotomous corymbs. *Flowers* rather large, yellowish. *Calyx* five-cleft, erect, thick. *Corolla* much longer than the calyx; tube gibbous, almost globose at the base, narrowing upwards; limb rotate, five-

parted; segments oblong, oblique. *Stamina* five, within the tube. *Ovary* double. *Styles* two, shorter than the stamina. *Stigma* small. *Follicles* two, baccate, as large as citrons, red, diverging, subglobose, exuding a milky juice when cut, with a ridge along the middle, and one at each side, which unite in a short blunt point, one-celled, many-seeded; the cell is recurved into the form of a crescent. *Seeds* contained in red fleshy arils or lobules, which are angled by mutual compression, oblong, chrysaloid, hollowed on the one side with incurved rounded edges, convex on the other, and longitudinally corrugated. *Embryo* contained in a conform *albumen; cotyledons* flat, round, cordate; *radicle* centripetal, cylindrical, longer than the cotyledons.

FAGRÆA CARNOSA. *W. J.*

Foliis subrotundo-ovatis mucronatis carnosis, floribus terminalibus solitariis.

In the neighbourhood of Bencoolen.

A parasitic *Shrub* growing on trees, with smooth greyish *bark*, and somewhat dichotomous *branches*. *Leaves* opposite, petiolate, subrotund with a short reflexed point, entire with reflexed margins, very smooth, thick, and fleshy. *Petioles* compressed, embracing the branch, and furnished with an intrapetiolar ligule or stipule. *Flowers* terminal, solitary, nearly sessile, embraced at the base by a few sheathing bracts. *Calyx* five-parted. *Corolla* of a dull yellowish-white colour; *tube* about four inches long, expanding into a five-parted limb. *Stamina* five, rising a little above the tube; *anthers* large. *Style* little more than half the length of the tube. *Stigma* four-lobed. *Berry* as large as a small egg, seated on the persistent calyx, ovate, rather pointed, two-celled, many-seeded; *seeds* nidulant.

Obs. This is the fifth species of *Fagœa* that I have met with in the Malay islands; the others have been already described in Roxburgh's *Flora Indica*. The *F. racemosa* grows to be a small tree, and the *F. volubilis*, doubtfully proposed by Dr. Wallich as a distinct species, is the same plant. The *F. auriculata* is a large shrub, and from the size of its flowers is the most splendid of the genus. I originally met with it at Singapore, but have since found it also at Tappanuly; the following particulars may be added to the description given by Dr. Wallich:

F. auriculata. *Flowers* terminal, generally three, rarely five, on short *pedicels*, each embraced by four opposite calyculate *bracts*, of which the outer two are the smallest. *Corolla* very large, yellowish-white. *Stamina* inserted near the bottom of the tube. *Stigma* large and flattened. *Ovary* two-celled, polysporous; the edges of the placentæ revolute. *Fruit* as large as a duck's egg, acuminated by part of the persistent style; *seeds* numerous, nidulant.

IXORA NERIIFOLIA. *W. J.*

Foliis linearibus acuminatis glabris, corymbis terminalibus.

Bunga Saluang, Malay. Native of the west coast of Sumatra.

A *Shrub*, with round smooth *branches*. *Leaves* opposite, short-petioled, linear, tapering to the point, acute, about nine inches long, by little more than half an inch broad, entire, with revolute edges, very smooth. *Stipules* interpetiolar, subulate, longer than the petioles. *Corymbs* terminal, erect, trichotomous. *Flowers* red. *Bracts* small, acute. *Calyx* small, four-toothed. *Corolla; tube* long, slender; *limb* spreading, four-parted, segments lanceolate, acute. *Stamina* four, alternate with the laciniæ of the corolla. *Style* a little longer than the tube. *Stigma* clavate. *Fruit* a berry.

Obs. The long narrow leaves readily distinguish this species; it is a handsome, delicate shrub.

LECANANTHUS. *W. J.*

Pentandria Monogynia.—Nat. Ord. Rubiaceæ. *Juss.*

Calyx campanulatus, ampliatus, coloratus, irregulariter divisus. *Corolla* tubo brevi, limbo 5-partito. *Ovarium* biloculare, polysporum, placentis centralibus connexis. *Stylus* bifidus. *Stigmata* 2, linearia crassa.—*Frutex, floribus capi-*

tatis involucratis terminalibus, æstivatione valvatâ.

LECANANTHUS ERUBESCENS.

Found in the interior of Bencoolen.

A small erect *Shrub ; stem* four-sided, two of the angles acute. *Leaves* opposite, short-petioled, ovate-lanceolate, acute at both ends, rather attenuated to the point, entire, smooth; about eight inches long. *Stipules* interpetiolar, large, ligulate, carinate towards the base. *Flowers* pale red, densely aggregated within the hypocrateriform cup of the involucre, forming a *head* which is terminal, nearly sessile, and turned backwards. *Involucre* monophyllous, entire. *Pedicels* none. *Calyx* superior, coloured, tomentose, thick and fleshy, much wider than the corolla, expanding into from two to four irregular, unequal, obtuse lobes; the calyces of the outer flowers are often so much produced on one side as to seem bilabiate. *Corolla, tube* short, segments five, acute, thick. *Æstivation* valvate. *Stamina* five, inserted on the tube; *anthers* large. *Ovary* crowned with a prominent nectarial ring, two-celled, polysporous; ovula arranged round central, semicylindrical placentæ. *Style* bifid. *Stigmata* two, thick and linear.

PSILOBIUM. *W. J.*

PENTANDRIA MONOGYNIA.—Nat. Ord. RUBIACEÆ. *Juss.*

Calyx patens, 5-partitus. *Corolla* tubo brevi, limbo 5-partito. *Stamina* basi corollæ inserta. *Stigma* clavatum, 10-alatum, exsertum. *Fructus* cylindricus, siliquæformis, foliolis calycinis persistentibus coronatus, bilocularis, polyspermus. *Semina* duplici serie axi affixa.—*Fruticosa, pedunculis axillaribus paucifloris, æstivatione valvatâ.*

PSILOBIUM NUTANS. *W. J.*

Found in the interior of Bencoolen.

Stem erect, four-sided, with rounded angles. *Leaves* opposite, petiolate, lanceolate, attenuated to both ends, acute, entire, smooth. *Stipules* interpetiolar, broad, acuminate, carinate. *Peduncles* axillary, drooping, bearing from three to six *flowers*. *Bracts* forming a kind of involucre at the base of the very short pedicels. *Calyx* superior, very large, composed of five leaflets or very deep segments, which are veined with red. *Stamina* five; *filaments* short; *anthers* long, erect. *Style* short. *Stigma* long, exsert, oblong-ovate, longitudinally ten-winged, the five alternate wings smaller. *Fruit* long, cylindrical, siliquose, crowned with the large persistent calyx, two-celled, many-seeded; *seeds* arranged in a double series in each cell.

OPHIORRHIZA HETEROPHYLLA. *W. J.*

Foliis oppositis subrotundo-ovatis, altero nano.

Found in the interior of Bencoolen.

This species is readily distinguished by the peculiarity of one of the opposite leaves being always dwarf or abortive; the other is subrotund-ovate, with a bluntish acumen, smooth, pale, and whitish beneath. The *stem* is erect and tomentose. *Flowers* in a small terminal cyme. *Capsule* compressed, obcordate.

QUERCUS RACEMOSA. *W. J.*

Foliis lato-lanceolatis integerrimis glaberrimis, spicis masculis paniculatis, fructibus spicatis nuce umbilicato-depressâ, calyci fructûs tuberculato.

Punning-Punning bunkus, Malay. Native of Sumatra.

A large *Tree*, with brownish *bark*. *Branches* smooth. *Leaves* alternate, short petioled, ovate-lanceolate, acuminate, attenuated to the *petiole*, very entire, very smooth, nerves well marked, and reddish beneath, six to eight inches long. *Stipules* small, linear. *Male spikes* numerous, panicled, terminal, and from the axils of the upper leaves, which are crowded round the thickened extremity of the branch, slender, hoary; *flowers* sessile, aggregated. *Female spikes* at first terminal, becoming afterwards lateral by the shooting up of the branch; *flowers* numerous, dense, sessile. MALE: *Calyx* six-parted, segments acute. *Stamina* fifteen to twenty. The centre of the flower is occupied by a densely villous disk.

FEMALE: *Calyx* rugose, turbinate, umbilicate. *Ovary* three to five-celled, each cell containing two ovula attached by a thread to its summit. *Acorns* large, depressed, umbilicate, with a short mucro. *Cup* flat, embracing the nut for about half its height, nearly an inch in diameter, rough with angular imbricated tubercles, which are large towards the base, and become small towards the edge.

OBS. This is a very splendid species from the great size of its racemes and acorns. *Punning-punning* is the generic appellation of the Oaks in Malay; in the Rejang dialect they are called Pasang.

QUERCUS URCEOLARIS. *W. J.*

Foliis elliptico-oblongis acumine gracili integerrimis glaberrimis, fructibus spicatis, calyce fructus subhemisphærico limbo patente.

Native of Sumatra.

A *Tree* with rough *bark*. *Leaves* alternate, petiolate, elliptic-oblong, terminated by a long, slender acumen, very entire, smooth, coriaceous, pale beneath; eight to nine inches long. *Fruit* on lateral *racemes*. *Acorns* rounded and flattened at top, umbilicate in the centre, and mucronate with the three short, persistent *styles*, rather perpendicular at the sides, half embraced by the calyx, which is cup-shaped, marked on the outer surface with small, acute, scaly points, concentrically arranged, and whose margin expands into a spreading, nearly entire, waved limb. The *ovary* is three-celled, each cell containing two *ovula*, and is lodged in the bottom of the large funnel-shaped *calyx*. The *acorn* contains a single exalbuminous *seed*, placed a little obliquely.

OBS. The spreading limb of the cups forms a good distinctive character, and renders this a very remarkable and curious species.

ARECA TIGILLARIA. *W. J.*

Frondibus pinnatis, foliolis acutis, spadicibus ramosis, flore unico femineo inter duos masculos, fructibus globosis.

Nibong, Malay.

Abundant in Sumatra and the Malay Islands, where it is much used in the construction of houses, &c.

Trunk erect, generally thicker than that of the common *Pisang* (*Areca Catechu*) armed, particularly on the lower part, with straight, slender, flattened spines. *Fronds* pinnate; *leaflets* linear, acuminate, reflexed at the edges so as to make the upper surface convex, smooth, with a few brownish scales on the middle nerve of the younger ones; they diminish in size to the top of the frond, and the last two are partly united at their base. *Stipes* of the frond scaly while young, compressed, grooved above. The sheaths armed like the trunk. *Spadix* within the sheath of the frond, embracing the stem, flattened at the base, much branched; flower bearing branchlets about two feet long, drooping, the lower ones three to four together, the uppermost solitary or in pairs. *Spathe* single, completely inclosing the spadix before expansion, compressed, two-edged, deciduous, partial spathes none. *Flowers* sessile, one female between two males; the latter considerably the largest, and deciduous. *Male* hermaphrodite. *Perianth* six-parted, the outer leaflets small, the inner much longer, and acuminated with fine points. *Stamina* six; *anthers* sagittate. *Ovary* small, surmounted by three linear styles. *Female Perianth* six-parted; leaflets nearly equal, rounder and shorter than those of the male. *Stamina* none. *Stigmas* three. *Fruit* globose, about the size of a carabine bullet, of a deep purple colour when ripe, with a glaucous tint, containing under a reddish pulp a single smooth, globular nut. *Nut* one-seeded, having a thickened whitish scar on the side, and a small areola at the base, opposite to the embryo. *Seed* solid; *albumen* runcinated; *embryo* basilar, short, cylindrical, obtuse.

OBS. This differs from the common *Areca* in the disposition of the flowers on the spadices, and in having the nut contained under a pulpy and not a fibrous covering. In *A. Catechu* the ovary is likewise monosporous.

ENCHIDIUM. *W. J.*

MONŒCIA MONADELPHIA.—Nat. Ord. EUPHORBIACEÆ. *Juss.*

Calyx 5-partitus. *Corolla* 5-partita. *Nectarium* glandulæ decem. MAS. *filamentum* columnare, 10-antheriferum; antheris radiatim patentibus. FEM. *Ovarium* trilobum. *Styli* 3. *Stigmata* 6.—*Flores masculi et feminei in eadem spicâ.*

ENCHIDIUM VERTICILLATUM. *W. J.*

Arbor spicularum. *Rumph. Amb. III. p.* 167. *t.* 106.

Not unfrequent on hills in Sumatra and the Malay Islands.

A large *Shrub;* I have not, however, met with any that had attained so great a size as mentioned by Rumphius. The *leaves* are arranged in a kind of irregular *verticils* at different distances along the branches, as exhibited in the figure quoted; on the young shoots they are sometimes irregularly disposed along the whole length; they are petiolate, lanceolate, acuminate, very entire, very smooth, firm and somewhat leathery, of various length, generally about six inches long by two and a half broad. *Petioles* from one to two inches and a half long, flattened above, striated. *Spikes* from among the upper verticils of leaves, bearing both male and female flowers, the former lowermost, all pedicellate. *Calyx* five-parted. *Corolla* purple towards the centre, five-parted, furnished with ten callous nectaries or glands at the base. In the male the filament is columnar, bearing ten *anthers,* which diverge in a radiated circle round the summit. The female has a three-lobed *ovary,* surmounted by three *styles,* with bifid *stigmata.*

OBS. There can be little doubt of the identity of this plant with Rumphius's *Arbor spicularum,* of which he says he was never able to procure the flower. I have seen great numbers of these plants in the wood, but only once was successful in observing the blossoms, and have never met with the fruit. As the spike, however, fortunately contained both male and female flowers, its characters have been sufficiently determined to assign its proper place. It comes nearest to *Cluytia,* but differs in the corolla, and in having ten anthers with filaments united into a central column. Both its fructification and habit appear to distinguish it from all the present genera of the Euphorbiaceous family.

ANTIDESMA FRUTESCENS. *W. J.*

Frutescens, foliis oblongo-ovalibus basi rotundatis supra glabris, racemis terminalibus et axillaribus subpaniculatis geminis solitariisque, nectarii glandulis quinis cum staminibus alternantibus.

Bencoolen.

A small diœcious *Shrub,* not exceeding a few feet in height. *Branchlets* tomentose. *Leaves* alternate, petiolate, oblong-oval, rounded, and sometimes subcordate at the base, acute, sometimes terminated by a short mucro or awn, entire, smooth above, subtomentose beneath, chiefly on the nerves; three inches long. *Stipules* long, subulate, acute. *Racemes* axillary and terminal, geminate and solitary, somewhat panicled, tomentose; when geminate, the outer *raceme* is simple, and the inner branched; *male racemes* generally longer than the leaves, *female* ones shorter. *Pedicels* solitary. *Bracts* shorter than the pedicels. MALE: *Calyx* five-parted, tomentose. *Nectary* of five, yellow, pilose glands, alternating with the stamina. *Stamina* five; *filaments* much longer than the calyx; *anthers* bifid; cells bursting transversely on the summits of the lobes. *Pistil* abortive, pilose. FEMALE: *Perianth* five-parted. *Ovary* superior, villous, oblong-ovate, compressed, one-celled, vesicular, containing two ovula, which are attached close together to one side near the top, and hang forward into the cell, which is in great part empty and inflated. *Styles* two, one often bifid. *Drupe* subglobose, purplish, about the size of a pepper-corn; *nut* one to two-seeded.

OBS. It has considerable resemblance to Roxburgh's *A. pubescens*; that, however, is a tree, while this is a small shrub. The most important difference appears to be in the nectary of the male flower.

SALACIA. *Linn.*

This genus seems to require a little elucidation. It was originally referred to *Gynandria*, the fleshy nectary on which the stamina are inserted having been mistaken for the germen, and the real ovary, on account of its smallness, having escaped the observation of Linnæus and Loureiro. This circumstance is now, I believe, generally admitted; there can therefore be no doubt of the identity of Roxburgh's *Johnia* with *Salacia*, and his *J. salacioides* agrees so well with *S. Chinensis*, particularly in having entire leaves, that it is questionable whether they are not the same, for it is to be observed, that in most of the species the leaves are only subopposite, and may occasionally on the same tree be found both opposite and alternate. *Tonsella prinoides*, Willd. Act. Acad. Nat. Berol. IV. is also without doubt a true species of *Salacia;* if it be not in fact the same plant as the *Johnia Coromandeliana*, Roxb. Fl. Ind. I. p. 178. *Calypso salacioides* of Aubert du Petit Thouars agrees exactly with these in the structure of the flower, but differs in having many-seeded berries. Some of the species of *Tonsella* appear likewise to have polyspermous fruit; but those which have definite seeds are probably true species of *Salacia.* It may be questioned whether the distinction, founded on the number of seeds, be really of generic value where the agreement is so exact in all other respects; especially if it should be found that a gradation exists from the one to the other in the fruit of the different species. This, however, can only be determined by an accurate examination of the ovaries and fruit of the various plants at present ranged under *Tonsella.* In the natural arrangement, *Salacia* undoubtedly bears the greatest affinity to *Hippocratea,* it being scarcely possible to distinguish the two genera when only in flower. It also agrees in many particulars with the *Celastrinæ,* but differs in having exalbuminous seeds. The union of the *Hippocrataceæ* and *Celastrinæ* has, however, been suggested by Mr. Brown, in his remarks on the Botany of Terra Australis. Under the above view the genus will be characterized as follows.—*Calyx* inferus, 5-fidus. *Corolla* 5-petala. *Stamina* 3, disco carnosa inserta. *Ovarium* 3-loculare, loculis 1—2-sporis, ovulis axi affixis. *Bacca* 1—3-sperma.

Frutices *vel* arbusculæ, *foliis suboppositis simplicibus.*

I have met with two species in Sumatra, one with anthers sessile on the nectary, which agrees very nearly both with *S. Chinensis* and Roxburgh's *J. salacioides;* the other with anthers supported on filaments, and nearly related to *J. Coromandeliana,* Roxb.

VITIS RACEMIFERA. *W. J.*

Tetrandra, foliis quinatis, foliolis spinescenti-serratis subtus incanis, cirrhis oppositifoliis racemiferis, racemis compositis longissimis, baccis dispermis.

Akar Charicun, or *Bayur Akar,* Malay. Native of Sumatra.

A large, strong, woody climber. *Branches* round, villous. *Leaves* alternate, quinate; *leaflets* pedicellate, oblong-obovate, acute, subspinoso-serrate, the serratures being formed by the spinescent termination of the nerves, smooth above, hoary beneath, frequently with a ferruginous shade. *Petioles* villous. *Cirrhi* opposed to the leaves, very long, simple or bifid; when bifid, one branch becomes the peduncle. *Racemes* very long, compound, consisting of numerous densely-flowered racemuli, inserted on a *peduncle* formed of the thickened tendril. The whole *raceme* is often a foot and a half in length. *Peduncles* ferruginously villous. *Flowers* sessile on the partial peduncles, small, green. *Calyx* minute, embracing the base of the corolla, quadridentate. *Corolla* deeply four-parted. *Stamina* four; *anthers* yellow. *Ovary* surrounded by a fleshy ring, tetrasporous. *Style* scarce any. *Stigma* thick. *Berry* of the shape of an olive, and nearly as large, purple, juicy, two-seeded.

OBS. This would be a species of *Cissus,* according to the Linnæan division; but that genus has now been united to *Vitis* by Mr. Brown, as they differ in nothing but the number of parts.

RHOPALA OVATA. *W. J.*

Foliis subsessilibus ovatis utrinque acutis integerrimis, pedicellis brevissimis cum calycibus ovariisque levissime tomentosis.

Found at Tappanuly.

A small *Tree*. *Leaves* alternate and opposite, almost sessile, broad, ovate, acute, sometimes acuminate, entire with revolute edges, very smooth, nerves distinct; ten inches long by six broad. *Petiole* none, save the thickened base of the middle nerve. *Racemes* below the leaves from former axils. *Pedicels* two-flowered; a bract at the base of each, and at the subdivisions. *Perianth*, together with the pedicels, slightly tomentose or nearly smooth. *Nectarial scales* four.

LINOCIERA ODORATA. *W. J.*

DIANDRIA MONOGYNIA.—Nat. Ord. OLEINÆ.

Foliis lanceolatis utrinque acutis glaberrimis, paniculis axillaribus foliis brevioribus.

At Natal, and on Pulo Mosella.

A large *Shrub*, with subdichotomous *branches*. *Leaves* subopposite, short petioled, oblong-lanceolate, acute at both ends, entire, smooth, and coriaceous; four to five inches long. *Panicles* axillary, opposite, much shorter than the leaves; *peduncles* opposite, three to five-flowered. *Flowers* subsessile, fragrant. *Bracts* small, oblong. *Calyx* four-parted. *Corolla* white, almost four-petaled; *petals* long, linear, united in pairs by means of the *filaments*, slightly cohering at the other divisions. *Stamina* two; *anthers* large, emarginate at the apex. *Ovary* two-celled, each cell containing two linear pendulous parallel *ovula*. *Style* scarce any. *Stigma* bifid.

In point of interest, the "Third" Memoir, as it is called, of Mr. Jack, far exceeds the previous ones, as it contains that gentleman's account made from recent specimens, of the most wonderful of all plants, the *Rafflesia Titan* (*R. Arnoldi*, Br.); *Dryobalanops Camphora*, which yields the Camphor of Sumatra, the most precious and costly of all the Camphors; the *Sagus lævis* of Rumphius, which affords the Sago of Sumatra and Malacca; the *Stagmaria verniciflua*, from which the *lacquer* or *varnish*, so highly prized and so successfully employed by the Japanese, is prepared; and lastly, four species of that highly curious genus, *Nepenthes* (*Pitcher-plant*), of which two are entirely new. I have reason to think that the present Memoir is very little known in this country, as I have never seen it quoted, nor met with any copy but that which has been kindly lent me by the mother of its lamented author. This number of the Malayan Miscellany is without date, and only bears the title "APPENDIX. Descriptions of Malayan Plants, by *William Jack*. No. 3."

RAFFLESIA. *W. J.*

DIŒCIA GYNANDRIA.

Perianthium monophyllum ventricoso-campanulatum, fauce coarctata nectario annulari incumbente coronata, limbo 5-partito subreflexo, laciniis rotundatis; *Columna* fructificationis maxima, crassa, stigmate truncato coronata, disco processibus pluribus corniculatis echinato.

MAS. *Antheræ* numerosæ, globosæ, sessiles, sub stigmate in orbem dispositæ, apice poro umbilicatæ, substantia cellulosa.

FEM. *Semina* minuta, nidulantia in substantia rimosa baseos columnæ, cui antheræ deficiunt.

Herba parasitica aphylla, flore giganteo.

RAFFLESIA TITAN.

Sumatran name, *Peliman Sikuddi*, or *Devil's Siri-box*.

Native of the forests in the interior of Sumatra, particularly those of Passummah Ulu Manna, where it was first discovered by Sir T. S. RAFFLES, on his journey into that country in 1818.

This gigantic flower is parasitic on the lower stems and roots of the *Cissus angustifolia*, Roxb. It appears at first in the

form of a small round knob, which gradually increases in size. The *flower-bud* is invested by numerous membranaceous sheaths, which surround it in successive layers, and expand as the bud enlarges, until at length they merely form a cup round its base. These *sheaths* or *bracts* are large, round, concave, of a firm membranaceous consistence, and of a brown colour. The bud, before expansion, is depressed, round, with five obscure angles, nearly a foot in diameter, and of a deep dusky red. The *flower*, when fully expanded, is in point of size, the wonder of the vegetable kingdom, its breadth across from the tip of the one petal to the tip of the other, being little short of three feet. The *cup* may be estimated capable of containing twelve pints, and the weight of the whole is from twelve to fifteen pounds. The inside of the cup is of an intense purple, and more or less densely villous, with soft flexible spines of the same colour; towards the mouth it is marked with numerous depressed spots of the purest white, contrasting strongly with the purple of the surrounding substance, which is considerably elevated on their lower side. The *petals* are of a brick red, with numerous pustular spots of a lighter colour. The whole substance of the flower is not less than half an inch thick, and of a firm fleshy consistence. It soon after expansion begins to give out a smell of decaying animal matter. The *perianth* is cyathiform, narrowed at the mouth, which is further contracted by a nectarial ring which surrounds it, leaning inwards. The *limb* is five-parted, somewhat reflexed, but turning upwards again at the point; the lobes subrotund and thick. In the centre of the cup rises a thick *column*, truncate and nearly flat on the top. At its base is a prominent ring or cord, and another a little above, both homogeneous in substance with the column. The summit of the *column* or *stigma* is a flat disk, about six inches in diameter, from which rise from forty to sixty corniculate processes, nearly erect, but diverging a little from the centre; the upper edge is thin, and rises up like the rim of a salver; the lower edge is incumbent and somewhat revolute. The sides of the column are angular.

In the *male*, the *stamina* are arranged in a circle under the lower edge of the *stigma*, by which they are concealed. Each *stamen* is lodged in a proper hollow, separated from the next by a process of the revolute edge. *Filaments* none. *Anthers* sessile, globular, about the size of a pea, dark-coloured, attached to the lower surface of the stigma. They have a white depressed spot on the summit, in the centre of which is a pore or foramen for the emission of the *pollen*. The whole substance is spongy and cellular.

In the *female*, the column is precisely similar, but wants the anthers and their hollows. In the centre its substance is full of irregular fissures, on the surface of which numerous minute *seeds* are observed. The *fruit* never bursts; but the whole plant gradually rots away, and the seeds mix with the putrid mass.

Such are the characters of this very extraordinary vegetable, which appears to have little affinity with any other, and to be as unique in its mode of fructification as in size.

It was, as already mentioned, first discovered by Sir Stamford Raffles, in the forests of Passummah Ulu Manna, and the specimens were forwarded by him to England in 1818. In the following year, numerous additional specimens were procured from various parts of the country, and an opportunity afforded for more minute examination, the particulars of which are contained in the foregoing short account. The greater part of these specimens have been transmitted to England, together with the observations made on the recent plants. Some time after their despatch, a letter was received from Sir Joseph Banks, acknowledging the receipt of the first specimens, which had all proved to be males, and suggesting the probability of the plant being parasitic, a conjecture which had, during the interim, been ascertained to be correct by investigation on the spot.

———

It will perhaps not be unacceptable to our readers, if I here subjoin some extracts from the admirable history of the male plant in the 13th volume of the Transactions of the Linnæan Society, and a very reduced figure of it, done from the same work, together with some account of a second species, discovered by Dr. Blume, and published in his rare and costly work, the *Flora Javæ*.

The accounts that first reached England of the *Rafflesia*, were communicated in a letter to the late Sir Joseph Banks, extracts from which Mr. Brown has published, of Sumatra, with the following remarks:—

"This gigantic flower, which forms the subject of the present communication, was discovered in 1818, on Sir Stamford's first journey from Bencoolen into the interior. In that journey he was accompanied by a Naturalist of great zeal and acquirements, the late Dr. Joseph Arnold, a member of this Society, from whose researches, aided by the friendship and influence of the governor, in an island so favourably situated and so imperfectly explored as Sumatra, the greatest expectations had been formed. But these expectations were never to be realized; for the same letter which gave the account of the gigantic flower, brought also the intelligence of Dr. Arnold's death.

"As in this letter many important particulars are stated, respecting the plant which I am about to describe, and a just tribute is paid to the merits of the Naturalist by whom it was discovered, I shall introduce my account by the following extract:—

Bencoolen, Aug. 1818.

"You will lament to hear that we have lost Dr. Arnold: he fell a sacrifice to his exertions on my first tour into the interior, and died of fever about a fortnight ago.

"It is impossible I can do justice to his memory by any feeble encomiums I may pass on his character; he was in every thing what he should have been, devoted to science and the acquisition of knowledge, and aiming only at usefulness.

"I had hoped, instead of the melancholy event I have now to communicate, that we should have been able to send you an account of our many interesting discoveries from the hand of Dr. Arnold. At the period of his death he had not done much; all was arrangement for extensive acquirements in every branch of Natural History. I shall go on with the collections as well as I can, and hereafter communicate with you respecting them, and in the mean time content myself with giving you the best account I am able of the largest and most magnificent flower, which, so far as we know, has yet been described. Fortunately I have found part of a letter from poor Arnold to some unknown friend, written while he was on board ship, and a short time before his death, from which the following is an extract—

"After giving an account of our journey to Passummah, he thus proceeds—

"'But here (at Pulo Lebbar, on the Manna River, two days' journey inland of Manna) I rejoice to tell you I happened to meet with what I consider as the greatest prodigy of the vegetable world. I had ventured some way from the party, when one of the Malay servants came running to me with wonder in his eyes, and said, "Come with me, Sir, come! a flower, very large, beautiful, wonderful!" I immediately went with the man about a hundred yards in the jungle, and he pointed to a flower growing close to the ground under the bushes, which was truly astonishing. My first impulse was to cut it up and carry it to the hut. I therefore seized the Malay's parang, (a sort of instrument like a woodman's chopping hook,) and finding that it sprang from a small root which ran horizontally, (about as large as two fingers or a little more,) I soon detached it and removed it to our hut. To tell you the truth, had I been alone, and had there been no witnesses, I should, I think, have been fearful of mentioning the dimensions of this flower, so much does it exceed every flower I have ever seen or heard of; but I had Sir Stamford and Lady Raffles with me, and a Mr. Palsgrave, a respectable man, resident at Manna, who, though equally astonished with myself, yet are able to testify as to the truth.

"'The whole flower was of a very thick substance, the petals and nectary being but in few places less than a quarter of an inch thick, and in some places three quarters of an inch; the substance of it was very succulent. When I first saw it, a swarm of flies were hovering over the mouth of the nectary, and apparently laying their eggs in the substance of it. It had precisely the smell of tainted beef. The calyx consisted of several roundish dark-brown concave leaves, which seemed to be indefinite in number, and were unequal in size. There were five petals attached to the nectary, which were thick and covered with protuberances of a yellowish-white, varying in size, the interstices being of a brick-red colour. The nectarium was cyathiform, becoming narrower towards the top. The centre of the nectarium gave rise to a large pistil, which I can hardly describe, at the top of which were about twenty processes, somewhat curved and sharp at the end, resembling a cow's horns: there were as many smaller very short processes. A little more than half way down, a brown cord, about the size of common whip-cord, but quite smooth, surrounded what perhaps is the germen, and a little below it was another cord, somewhat moniliform.

"'Now for the dimensions, which are the most astonishing part of the flower. It measured a full yard across; the petals, which were subrotund, being twelve inches from the base to the apex, and it being about a foot from the insertion of the one petal to the opposite one; Sir Stamford, Lady Raffles, and myself, taking immediate measures to be accurate in this respect, by pinning four large sheets of paper together, and cutting them to the precise size of the flower. The nectarium, in the opinion of all of us, would hold twelve pints, and the weight of this prodigy we calculated to be fifteen pounds.

"'I have said nothing about the stamina; in fact, I am not certain of the part I ought to call stamina. If the moniliform cord surrounding the base of the pistil were sessile anthers, it must be a polyandrous plant; but I am uncertain what the large germen contained; perhaps there might be concealed anthers within it.

"'It was not examined on the spot, as it was intended to preserve it in spirits and examine it at more leisure; but from the neglect of the persons to whom it was entrusted, the petals were destroyed by insects, the only part that retained its form being the pistil, which was put in spirits along with two large buds of the same flower, which I found attached to the same root; each of these is about as large as two fists.

"'There were no leaves or branches to this plant; so that it is probable that the stems bearing leaves issue forth at a different period of the year. The soil where this plant grew was very rich, and covered with the excrement of elephants.

"'A guide from the interior of the country said, that such flowers were rare, but that he had seen several, and that the natives call them *Krûbût*.

"'I have now nearly finished a coloured drawing of it on as large drawing-paper as I could procure, but it is still considerably under the natural size; and I propose also to make another drawing of the pistil removed from the nectarium.

"'I have now, I believe, given you as detailed an account of this prodigious plant as the subject admits of; indeed it is all I know of it. I would draw your attention, however, to the very great porosity of the root, to which the buds are attached.'"

The specimens sent proved to be male, and the drawing alluded to, engraved for Mr. Brown's paper, is here copied (Tab. XIV.), together with sections, showing the situation of the anthers and their structure. The following is Mr. Brown's generic character, derived from the first specimens that were sent over:—"*Perianthium* monophyllum, coloratum; *tubo* ventricoso; *corona faucis* annulari, indivisa; *limbo* quinquepartito, æquali.—MAS. Columna (inclusa); *limbo apicis* reclinato, subtus simplici serie polyandro; *disco* processibus (concentricis) tecto. *Antheræ* sessiles, subglobosæ, cellulosæ, poro apicis dehiscentes.—FEM. Some "additional obser-

vations" to Mr. Brown's paper contain a letter from Mr. Jack to Sir Stamford Raffles, detailing the discovery of the female flower by that gentleman, as related above. The species Mr. Brown names *Arnoldii*, in compliment to Dr. Arnold. A second species, *R. Horsfieldii*, Mr. Brown mentions as having been found by Dr. Horsfield, in Java: the two species, however, at present, are only to be distinguished by the great difference in the size of the flowers: those of the one, *R. Arnoldii*, being nearly three feet, of the other hardly three inches, in diameter.—Their place in the Nat. System Mr. Brown considers to be near *Asarineæ* or *Passifloreæ*.

TAB. XIV. Fig. 1. Flowers of *Rafflesia Arnoldii*, Br. (*R. Titan*, Jack,) accompanied by a scale of feet to give an idea of its nat. size. 2. Portions of the Column, to show the situation of the Anthers, about three-fourths of the nat. size. 3. Anther—*magnified* three diameters. 4. Transverse section of ditto—all taken from Mr. Francis Bauer's splendid figures in the Linnæan Transactions.

A third species has been detected by Dr. Blume, in Nousa Kambangan, a small island dependent on Java, situated at the mouth of the river. He had at first some buds only brought to him, which, from their structure, he judged might belong to a species of *Rafflesia*; but till he went and gathered specimens himself, in the island where alone it is said to grow, he had no idea of the real nature of the plant. It was in November, 1824, that he visited the spot, where, he says, in the account published in the "Batavian Courant, for March, 1825, "It was upon the declivities of some limestone hills, densely covered with entangled and creeping shrubs, that the 'Patma,' as it is called by the natives, was to be found. One of the guides stopped from time to time, and having looked attentively at the shrubs, he suddenly pointed to a branch on which grew one plant. It was instantly cut down, and proved to be a species of *Cissus*,[1] known to the natives by the name of *Walieran*, the blossoms of which, however, I could not procure. All the guides now strove to earn the reward which I offered for a certain number of these vegetables, and a few minutes had scarcely elapsed when a little bud was found growing out of the exposed root of the *Cissus*, lying upon the ground, and which had rather the appearance of an excrescence of the root itself than any natural production. Two buds more were soon after brought me in different stages of growth: and indeed it was an astonishing sight, which I shall never forget, when I beheld a large flower-bud, resembling a Cabbage-head, and very near its expansion —for the outer red-brown scales surrounding the perianth lay loosely over each other, so that the upper part of the perianth, externally of a flesh-colour, was exposed to view.

On another root of the Vine, I perceived, to my joy, a fully expanded flower of this wonderful plant, having a diameter of two feet, while within, the great column, beset with raised points, attracted the eye by its vivid carmine-red colour.

These specimens were afterwards figured and described in the *Flora Javæ*, where the author assigns to *Rafflesia* and his nearly allied genus *Brugmansia*, a new Order, RHIZANTHEÆ, with the following character.—*Flowers* perfect, or by abortion diæcious. *Perianth* superior, simple, deeply divided, with an imbricated or induplicate æstivation. *Anthers* several, affixed in a simple series to the central column, inverted (*posticæ*), opening with one or two pores at the apex. *Pseudocarpium* (*Peridium, Sporangium*, Link.), one-celled; receptacles (*placentæ*) numerous, parietal, densely covered with minute *spori* (*sporidia*, Link), which are internally capillaceo-cellular. — VEGETATION: Plants between fleshy and cellular, subglobose, parasitic, arising from beneath the bark of the roots of other plants, destitute of root, stem, and leaves, consisting of a solitary flower, surrounded by scales."

This Order Dr. Blume is inclined to place among the higher orders of Acotyledonous

[1] This is a different species from that on which *Rafflesia Arnoldii* is a parasite;—*C. scariosa*, Bl. *n. sp.*; "foliis pedatis triphyllis coriaceis glabris, foliolis elliptico-oblongis, basi inæquali-rotundatis apice obtusiusculis et grosse serratis serraturis apice scariosis, caule rimoso."

or Cryptogamic plants.[1] His species he calls "*R. Patma;* perianthio intus nudo, columnæ processibus rectiusculis." His figure we have here copied.

Tab. XV. Fig. 1. *Rafflesia Patma*, with a scale of feet indicating its nat. size. 2. Section of the same, the upper part of the Perianth being removed, showing the situation of the Anthers under the margin of the Column, and the "*pseudocarpium*" in the centre of the substance, filled with spores. 3. Portion of the inner lining of the pseudocarp with its spores—*slightly magnified.* 4. Solitary Spore:—*much magnified.*

DRYOBALANOPS. *Gærtn.*

Monadelphia Polyandria.

Calyx monophyllus, quinquepartitus, laciniis lineari-lanceolatis, patentibus. *Corolla* pentapetala, petalis basi junctis ovato-lanceolatis, calyce longioribus. *Stamina* plurima, monadelpha, hypogyna, longitudine fere calycis, conniventia; filamenta in annulum brevem coalita; antheræ supra tubum filamentorum subsessiles, longæ, lineares, acutæ, mucrone membranaceo, biloculares. *Ovarium* ovatum, stylo acuminatum, superum, triloculare, loculis disporis. *Stylus* filiformis, staminibus longior. *Stigma* capitatum. *Capsula* calyci grandefacto insidens et cincta laciniis ejusdem in alas spatulatas foliaceas erecto-patentes mutatis, unilocularis, trivalvis, monosperma. *Semen* embryone exalbuminosa, inverso, cotyledonibus inequalibus, chrysaloideo-contortuplicatis.

[1] "Plantæ singulares," he says, "vel miranda potius regni vegetabilis monstra, quibus hæcce familia componitur, in bivio quasi *Cotyledoneas* inter atque *Acotyledoneas* positæ, utrasque videntur connectere. E plantis quidem cellularibus maxima cum fungis gaudent affinitate, quippe quæ tum radice, caule foliisque destituuntur, tum modo prorsus simili evolvuntur. Uti enim fungi complures, e. g. inter *Coniomycos* genera *Roestelia*, Rebent., *Æcidium*, Pers., *Ustilago*, Gmel., etc, in plantis vivis sub epidermide oriuntur, quæ tum intumescit, et tandem disrupta involucri instar remanet, ita pacto fere eodem *Rhizantheæ*, e cortice radicum alienarum prognatæ, vitam earundem evolutione sua perturbant, id quod ex permutata vasorum directione, atque e substantiæ corticalis tumore luce clarius patet. Verum licet *Rhizantheæ* hacce ratione plurimum cum fungis exhibeant analogiæ, altiore tamen evolutionis gradu ab iisdem recedunt, plantarum perfectiorum magis absolutam mutuando formam. Namque non solum involucrum corollinum antherasque polliniferas, sed et textum cellulosum multo perfectiorem, quam in fungis, in ipsis observare licet, quocirca ipsissimus R. Brown, Botanicorum nostri ævi facile princeps, *Rafflesiam* in *Dicotyledoneis* numerare minime dubius, proxime *Passifloreas* vel *Asarineas* collocandam putavit."

DRYOBALANOPS CAMPHORA. *Coleb.*

Kapur Barus, *Malay.*

Specimens in flower were sent by Mr. Prince, from Tapanooly, to Sir T. S. Raffles, in 1819, from which the above generic description is taken. I have since had an opportunity of seeing these noble trees in their native forests, but not at the time of flowering, and I am informed that they do not bear above once in three or four years. Mr. Colebrooke's description in the Asiatic Researches, of the tree and fruit, is so complete, that I cannot do better than copy it.

"*Trunk* arboreous. *Bark* brownish. *Leaves* superior alternate, inferior ones opposite; elliptic, obtusely acuminate, parallel-veined, entire, smooth; three to seven inches long, one to two broad. *Petiole* short. *Stipules* in pairs, subulate, caducous. *Perianth* one-leaved, five-parted, persistent. *Capsule* superior, ovate, woody, fibrous, finely streaked with longitudinal furrows, embraced at the base by the calycine hemispherical cup, and surrounded by its enlarged leaflets, which are converted into large, foliaceous, spatulate, rigid, reflex wings, one-celled, three-valved. *Seed* solitary, conform to the cavity of the capsule. *Integument* simple, thin, membranaceous, thickened along one side, and thence penetrating to the axis, and continued between the interior fold of the cotyledons. *Perisperm* none. *Embryo* conform to the seed, inverse, milk-white. *Cotyledons* two, unequal; *almond* fleshy thick, chrysaloid contortuplicate; the exterior one larger, convolute, and cherishing the interior one, smooth without, wrinkled within; the interior one much smaller, wrinkled on both sides, uniform or round, cordate (as is the exterior one, if its folds be expanded). *Plumule* simple, conical, two-leaved. *Radicle* near the summit towards the back, columnar, a little curved, and ending in a short conical lip; ascending. As. Res. XII. p. 539."

To this accurate and ample description,

I can only add the particulars which the examination of flowering specimens has enabled me to supply. The flowers are terminal and axillary, forming a kind of panicle at the extremity of the branches. The corolla is five-petaled, longer than the calyx, the petals ovate-lanceolate, and in some degree adnate or connected together at the base. The stamina are numerous, and have their filaments united into a ring, in which particular it differs from the genera most nearly related to it. The anthers are nearly sessile on the tube of the filaments, conniving into a conical head round the style, and terminating in acute, membranaceous points. The ovary is three-celled, containing two ovula in each cell. The style is longer than the stamina, and crowned by a capitate stigma.

In Sumatra the Camphor-trees are confined to the country of the Battas, which extends about a degree and a half immediately to the North of the Equator. They are also found in Borneo in nearly the same parallel of latitude, and I have reason to believe that there are some in the neighbourhood of Singapore and Johore. This valuable tree is not known to exist in any other part of the world, and on this account, as well as the difficulty of obtaining its produce, this kind of Camphor bears an exorbitant price. It is all carried to China, where it sells for about twelve times as much as that of Japan.

This Camphor is found in a concrete state, occupying cavities and fissures in the heart of the tree. In order to obtain it, the tree is felled and split into lengths, to allow of the extraction of the crystallized masses. The same trees yield both the concrete substance and an oil, which is supposed to be the first stage of the formation of the Camphor. The Sumatran Camphor is little known in Europe, and it would perhaps deserve examination to ascertain how far its properties differ from those of the common kind. It appears to be less volatile, and its odour is not so diffusive. A quantity of it has been recently forwarded to Sir E. Home, for the purpose of experiment.

For the natural affinities and a more detailed account of the method of procuring the Camphor,[1] I may refer to the able paper

[1] The following particulars concerning the extraction of the Camphor, were communicated by Mr. Prince, Resident at *Tapanooly*, to Dr. Roxburgh, and are extracted from the 12th vol. of the Asiatic Researches above referred to:—

"This tree grows spontaneously in the forests; and is to be found in abundance from the back of *Ayer Bongey*, as far north as *Bacongan*, a distance of two hundred and fifty miles. It may be classed among the tallest and largest trees that grow on this coast; several within daily view measuring six or seven feet diameter. Before it acquires such dimensions, its age is conjectured to be very considerable; but it will produce *Camphor* at a much earlier period, when the tree does not exceed two and two feet and a half in diameter. The same tree which yields the Oil would have afforded *Camphor*, if unmolested; the former being supposed to be the first stage of the latter's forming, and is consequently found in younger trees. The natives have no certain means of ascertaining the tree which produces either the one or the other; although there are some men, styled *Toongoo Nyr Cappoor*, who pretend to that knowledge; but they cannot give any reasons for their judgment, beyond favourable dreams, which superstition has rendered infallible: and it must be admitted that the success of this description of people, in discovering and procuring, is greater than the majority of those who go in search of the *Camphor;* the distinction may have arisen from the peculiar favour of fortune to some individuals over others, as in most other circumstances of life, from whence they have acquired a celebrity, otherwise they could give some rational explanation of their superior success. Both *Oil* and *Camphor* are found in the heart of the tree, occupying a vacuum which, in others is frequently filled with pitch; but it does not extend to the whole length: on the contrary, they are found in small portions, of a foot, and a foot and a half long, at certain distances. The method of extracting the Oil is merely by making a deep incision with a *billiong* or *Malay* axe, in the tree, about fourteen or eighteen feet from the ground, till near the heart, where a deeper incision is made with a small aperture; and the Oil, if any in the tree, immediately gushes out, and is received in bamboos, or any other utensil better approved of; in this manner, a party proceeds through the woods wounding the Camphor-trees till they attain their object. The *Camphor* is procured in pretty nearly the same way. The trees are cut to the heart about the same height from the ground as in the former instance, till the *Camphor* is seen; hundreds may be thus mutilated before the sought-for tree is discovered; when attained, it is felled, and cut in junks of a fathom long, which are again split, and the *Camphor* is found in the heart, occupying a space in circumference of the thickness of a man's arm. The produce of a middling-sized tree is about eight *China catties*, or nearly eleven pounds, and of a large one, double that quantity. The *Camphor* thus found is called *Se Tantong*. It is often the case that the trees which have

already quoted. It belongs to the same natural family with *Dipterocarpus*, *Shorea*, &c.

SAGUS LÆVIS.

HEXANDRIA MONOGYNIA.

Frondibus inermibus pinnatis, spadicibus alterne ramosis, floribus singulæ squamæ binis, hermaphroditis, fructibus subglobosis.

Sagus lævis, No. 4. *Rumph. Amb. I. p.* 76.

Rambiya, *Malay*.

This valuable *Tree* rises to the height of about twenty feet, and is generally surrounded by numerous smaller and younger plants which spring up around it after the manner of the Plantain (*Musa sapientum*). The *stem*, which is about as thick as that of the Cocoa-nut tree, is annulated by the vestiges of the fallen leaves, and the upper part is commonly invested with their withered sheaths. The *leaves* resemble those of the Cocoa, but grow more erect, and are much more persistent, so that the foliage has not the same tufted appearance, but has more of the graceful ascending curve of that of the *Saguerus Rumphii*: they are pinnate, unarmed; the leaflets linear, acute, carinate, and smooth. The tree is from fifteen to twenty years in coming to maturity, the fructification then appears, and it soon after decays and dies. The *inflorescence* is terminal; several *spadices* rise from the summit of the stem, inveloped in sheaths at their joints, and alternately branched. It is on these branches that the *flowers* and *fruit* are produced, and they are generally from five to eight inches in length. They are of a brown colour, and closely imbricated with broad scariose scales, within which is a quantity of dense ferruginous wool, in which the minute flowers are imbedded and completely concealed. Each scale supports two *flowers*, which are hermaphrodite, and scarcely larger than a grain of turnep-seed. The *Perianth* is six-leaved, of which three are interior, the leaflets nearly equal. *Stamina* six; *filaments* very short; *anthers* oblong, two-celled. *Ovaria* three, connected together in the middle, each monosporous. *Style* none. *Stigma* small. *Fruit* single, nearly globular, somewhat depressed at the summit, but with a short, acute, mucro or point in the centre; it is covered with scales which are imbricated from the top to the bottom, and are shining, of a greenish straw-colour, of a rhomboidal shape, and with a longitudinal furrow down their middle. Below the scales, the rind is of a spongy consistence, and the fruit contains a single *seed*, of rather an irregular shape, and having the *umbilicus* situated laterally a little above the base of the fruit. The progress of the fruit to maturity is very slow, and is said, according to the best information I can obtain, to occupy about three years from the first appearing of the spadices to the final ripening of the fruit. During the period of inflorescence, the branches of the spadix are brown, and apparently quite bare. Afterwards a number of small green knobs appear above the brown scales, which go on enlarging, till they at length acquire the size of a small apple. But few fruit come to maturity on each branch.

In habit and character this tree recedes considerably from the true *Palmæ*. Its propagation by radical shoots, exactly in the same manner as the common cultivated Plantain, is peculiar, and is not observed in the true Palms. The terminal inflorescence and death of the tree after fructification, is another peculiarity. It is allied to *Calamus* by its retroversely imbricated fruit.

This species of Sago is abundant in many parts of Sumatra and at Malacca, and is employed in the preparation of Sago for food. Considerable quantities are made at the Poggy Islands lying off the west coast of Sumatra, where it in fact forms the principal food of the inhabitants. The Sago of Siak is remarkably fine, and is also, I believe, the produce of this species. At

been cut, and left standing in that state, will produce *Camphor* in seven or eight years after, which is distinguished by the name of *Oogar*, but is inferior in appearance, though of the same quality. The sorts of *Camphor* called *belly* and *foot*, are the scrapings of the wood that surrounds it.

the Moluccas the spinous sort is considered superior to this, but I am doubtful whether it exists in Sumatra. For making the Sago, the tree must be cut before fructification commences, as it then becomes hard and dry. The process of making it has been so often described, that it is needless to repeat it here.

STAGMARIA. *W. J.*
PENTANDRIA TRIGYNIA.

Calyx inferus, tubulosus, deciduus, ore irregulariter ruptus. *Corolla* pentapetala, petalis stipiti germinis insertis. *Stamina* quinque, petalis alterna, filamentis longitudine fere corollæ ; antheris oblongis. *Ovarium* trilobum, lobis monosporis, 1—2 sæpe abortivis. *Styli* 1—3 ex apicibus loborum ovarii staminibus breviores. *Stigmata* obtusa. *Bacca* reniformis, hinc sulcata, cortice varicoso, monosperma. *Semen* exalbuminosum; embryone erecto, pseudo-monocotyledoneo, fissura laterali; radicula incurva.

Arbor succo resinoso caustico scatens, foliis simplicibus exstipularibus, floribus paniculatis.

This genus is nearly related to *Rhus*, but is distinguished by the following particulars. The petals and stamina are both inserted on the stipes of the ovary, which is not surrounded by a nectarial ring, as in *Rhus*, and is three-lobed when perfect. The styles are inserted on the lobes of the ovary, and do not spring from one point. Their number depends on the number of perfect lobes of the germen, and it is most common to find only one. The calyx is tubular, deciduous, and bursts irregularly. The structure of the fruit is also different, the seed not being here contained in a nut, and having the embryo erect, not inverse, as in *Rhus*.

On all these accounts, added to the difference of habit, particularly in having simple leaves, I have little hesitation in considering it as a distinct genus.

STAGMARIA VERNICIFLUA. *W. J.*

Arbor vernicis. *Rumph. Amb. II. p.* 259. *t.* 86.

Kayo Rangas, *Malay.*

Native of the Eastern Islands; it does not appear to be abundant in Sumatra, but occurs occasionally in the neighbourhood of rivers, as at Nattal and Moco-Moco.

This tree grows to a considerable size; the branches and branchlets are smooth, round, and marked with small dots. *Leaves* alternate or scattered, petiolate, ellipticolanceolate, about eight inches long, subattenuate to the base, rather acute, sometimes obtuse, or even retuse at the point, very entire, very smooth, firm, and shining, with lucid nerves. *Petioles* about an inch long, flattened above; *stipules* none. *Panicles* axillary, on rather long peduncles. *Flowers* numerous, pedicellate, white, having rather a narcotic smell. *Calyx* tubular, deciduous, bursting into two or three irregular segments. *Corolla* much longer than the calyx, spreading, somewhat reflex, five-petaled; *petals* oblong, rather obtuse, adnate at the base to the column which supports the ovary. *Stamina* five, inserted on the same column above the petals, alternating with them, and nearly of the same length; *filaments* thread-shaped; *anthers* short, oblong, two-celled; *ovary* on a pedicel or column, sometimes three-lobed, but more frequently there is only one distinct lobe, whose position on the pedicel is rendered oblique by the abortion of the other two; each lobe contains a single ovulum attached to the inner angle. *Styles* crowning the lobes of the ovary, from one to three, according to the number of perfect ovaries or lobes, shorter than the stamina. *Stigmata* obtuse. *Berry* as large as a fresh walnut, reniform or somewhat spheroidal, but rather irregular in shape, generally furrowed on one side; the rind is rough and brownish, of a spongy texture, often exhibiting on the surface the appearance of varicose veins, and when cut, exudes an acrid juice; it contains a single seed, similar in form to the fruit, and equally abounding with a corrosive gum or resin. *Embryo* exalbuminous, erect. *Cotyledons* united, having a fissure on one side; *radicle* at the base of the fruit, short, incurved upon the cotyledons at the lower part of the fissure.

Obs. The wood of this tree is of a fine dark colour towards the centre, and lighter coloured near the circumference. The bark exudes a resin which is extremely acrid, and, applied to the skin, causes excoriation and blisters. The people consider it dangerous to handle any part of the tree, and even to sit or sleep under its shade. This resin, on exposure to the air, soon assumes a black colour, and becomes hard; it is collected and employed as a varnish, and sells for this purpose at a high price. According to Rumphius, it is this tree which yields the so much celebrated Japan lacquer or varnish, and he considers it the same with that of Siam and Tonquin. Loureiro, however, who had better opportunities of observing the latter, represents the varnish of those countries as the produce of a different tree, which he has described under the name of *Augia*. The varnish of Siam and Cochinchina is probably the best; but that of Celebes and Java, which is the produce of this tree, is also employed for the same purposes, and cannot be much inferior, since it bears as high a price, and according to Rumphius, higher. The process of obtaining and using it is thus given by Rumphius:—"The exhalations of this tree are considered noxious, and the people of Macassar and other parts of Celebes in particular, entertain such dread of it, that they dare not remain long under it, much less repose beneath its shade; they say that whoever receives the droppings from it, will have his body swell and be affected with malignant sores. As, however, it furnishes the so celebrated varnish, other people boldly repair to this tree, particularly the Chinese and Tonkinese, who employ great precautions in collecting the resin, which is accomplished in the following manner. A number of Chinese proceed, about evening, to the place where the trees grow, which is always at a distance from the resort of men or animals, each selects a few, and inserts into the trunks two pieces of bamboo, sharpened at their points, in such a manner as to penetrate the bark in a somewhat oblique direction. These remain all night, and are extracted before sun-rise the next morning, the trees yielding no juice during the day. The resin is found in greater or less quantity according to the richness or poorness of the soil, and is obtained only at certain seasons of the year, particularly about the time of flowering. The people who collect it unite the produce of their labour, and afterwards make an equal division of the whole, on which account this resin maintains a high price, a single pikul (containing a hundred catties) selling, in those provinces of China which do not possess this tree, for two or three hundred dollars; in Tonkin and Camboja, however, it may be had for thirty, fifty, or sixty dollars. It is a custom among the Chinese, when they approach this tree, first to rub its trunk lightly, before inserting the bamboos, wishing by this to show that they are not afraid, for they say that timid persons will sooner feel its noxious effects than those who are bold and fearless.

"The resin is prepared for varnish in the following way:—To one pound of resin add an equal weight of the oil of Tang-yhu, which is a Chinese tree related to the Boonga Tanjong [*Mimusops Elengi*], from whose fruit a red transparent oil is prepared, resembling our Linseed Oil: others put one pound of oil to three of the resin, which are gently heated together, and make a very black varnish. If, however, to one pound of resin, two pounds of oil be added, a varnish of a brownish yellow, and sometimes of a straw-colour, is produced, with which wood is lightly done over, to bring out the grain and veins. Moreover, if while the varnish is heated, red lead, powdered galls, or other dry pigments be added, it gives the same colour to the work upon which it is employed. This liquid varnish ought to be covered with water to prevent its becoming hard. The articles to which the varnish is applied must always be placed in a cool and moist place to dry, which they do slowly; but when once hardened, the varnish never becomes soft again, except by the suffusion of hot water, which often dissolves it.

"The Chinese carry this prepared resin in large pots from Siam and Camboja to Japan, where it is disposed of to great profit.

"The Japanese are the most skilful in preparing and ornamenting all kinds of wooden articles with this varnish, of which they annually use large quantities, and their black lacquered works are dispersed, on account of their elegance, to all parts of the world."

Loureiro says, that the black lacquer is produced by the varnish in its natural state, unmixed with any foreign ingredient, and that it is only for producing red and other colours that pigments are added. He gives his *Augia* as a native of China, Cochin-china, Camboja, and Siam; Rumphius' tree is a native of Java, Celebes, Bali, and other parts of the Archipelago.

Under the article Sanga, in the Encyclopédie Méthodique, a part of Rumphius' account of this tree is given, but by a singular mistake of the reference to the plate, it is conjectured to be a species of *Hernandia*, an error which the slightest attention to the terms of the description ought to have prevented. In the first volume of the same work, the *Arbor vernicis* is made a species of *Terminalia*, under the specific appellation of *T. Vernix*, and the supposition has not been rejected by later authors. It is needless to add, that it has not the least relation to *Terminalia*.

NEPENTHES.

DIŒCIA MONADELPHIA.

Char. Ess. MAS. *Calyx* 4-partitus. *Corolla* nulla. *Filamentum* columnare. *Antheræ* in globum compactæ.

FEM. *Calyx* et *corolla* maris. *Stigma* sessile, 4-lobum. *Capsula* supera, 4-valvis, 4-locularis, polysperma. *Semina* linearia, paleacea.

Char. Gen. *Calyx* coriaceus, profunde 4-partitus, patens.

MAS. *Filamentum* columnare, erectum, cylindricum, calyce paullo brevius. *Antheræ* plures, luteæ, biloculares, in globum compactæ.

FEM. *Ovarium* superum oblongum tetragonum. *Stylus* nullus. *Stigma* peltatum, 4-lobum. *Capsula* oblonga, utrinque attenuata, 4-angularis, lateribus sulcatis, 4-locularis, 4-valvis, valvis medio septiferis. *Placentæ* nullæ, præter dissepimenta. *Semina* numerosa, inclusa, tunica membranacea rufescente utrinque elongata acuta. *Albumen* oblongum, embryone terete monocotyledone longitudine fere albuminis.

Folia apice in cirrhum urniferum producta. Racemi primo terminales, demum, crescente caule, laterales et oppositifolii.

This remarkable genus offers little affinity with any other, and its place in the natural arrangement is undetermined. Nothing can exceed the sportive variety which nature has displayed in the adornment of these singular plants. Their chief peculiarity is the urn-shaped appendage to the leaf, the use and purpose of which it is not easy to discover. Some Naturalists, who think it necessary in all cases to give an answer to the question of "cui bono," have expatiated, with more imagination than truth, on the benevolent provision of these vegetable fountains for the refreshment of the thirsty traveller in tropical regions. Into this field of speculation it is unnecessary to enter, or to detail the superstitious ideas entertained respecting them, by the ruder inhabitants of the countries in which they grow.

The tendril hangs from the extremity of the leaf, frequently twisting itself round some neighbouring twig, and dilates at its extremity into an urn, which turns upwards in such a manner as always to preserve its perpendicularity. These urns vary in form in the different species, and are frequently tinted with the most beautiful colours. Some are long and tubular, and others are variously dilated or inflated. They are not, however, quite cylindrical, being all more or less flattened anteriorly, and some species being there furnished with two membranaceous wings or fringes. The bottom of the urns is beautifully and finely punctate on the inner surface, apparently by ducts or vessels, from which the water is secreted. The margin is finely and re-

gularly striated, and generally more highly coloured than the rest of the urn; it turns inwards, and forms a peculiar inverted rim, which is denticulate at the edge, in a manner corresponding to the striæ. By this peculiar inversion, it becomes impossible entirely to empty the cup of its water by holding it downwards, and it also forms a kind of trap for whatever enters from without, as ingress proves easier than regress, owing to the row of teeth just mentioned, which oppose themselves to it. The cups, in consequence, are almost always found full of insects that have been lured into the toil, and paid the forfeit of their curiosity. While young, the mouth of the cup is closed by an operculum or lid, attached by a kind of hinge to the posterior angle, which opens at a certain stage, and never closes again. The young cups are about half-full of a pure, limpid, and almost tasteless fluid, but after the opening of the operculum it soon becomes polluted with foreign matter. It has been stated that the lid shuts every night to supply the waste of fluid during the preceding day, but a very little observation shows this to be a mistake. The Malay name of the genus is *Priokra*, or *Kachongbruh*, which signifies the *Monkey-cup*.

NEPENTHES RAFFLESIANA. *W. J.*

Foliis petiolatis, ascidiis inferiorum ventricoso-campanulatis antice membranaceo-alatis, superiorum infundibuliformibus nudis, omnium ore pulcherrime striato obliquo postice assurgente.

Native of the forests of the island of Singapore.

The *Root* is fibrous. *Stem* ascending at the base, becoming erect, and supporting itself on the neighbouring trees; the young parts covered with a deciduous tomentum or down. The *leaves* are alternate, petiolate, the lower ones crowded and lanceolate, the upper ones more remote and oblong; the adult leaves are smooth; all are entire, have inconspicuous lateral nerves, and the middle one elongated into an urn-bearing tendril. The *Cirrhi* of the lower leaves are not twisted, but hang straight from the apex; they terminate in larger, ventricose, and highly coloured *ascidia* or urns, fringed along the anterior angles with two membranaceous fimbriate wings, somewhat contracted at the mouth, which opens obliquely, rising much higher, and slightly recurved behind, where the operculum is inserted. The *tendrils* of the upper leaves are twisted into one or two spires at the middle, and terminate in long ascending funnel-shaped urns, flattened anteriorly but not winged, and gracefully turned at the mouth like an antique vase or urn. Both have the inverted margin beautifully and delicately striated, and variegated with parallel stripes of purple, crimson, and yellow. The *opercula* are incumbent, membranaceous, ovate, marked with two principal longitudinal nerves, and cuspidate behind the hinge. The *racemes* are at first terminal, but the stem begins, after a time, to shoot beyond them, and they become lateral, and are always opposed to a leaf which differs from the others in being sessile, and its cirrhus never having an urn at its extremity. The *pedicels* are one-flowered.

MALE. *Calyx* deeply four-parted, tomentose on the outer surface, smooth, red, and punctate on the inner, segments oblong, obtuse, reflex. *Corolla* none. The *stamineous column* (columna staminea) central, erect, thick, red. *Anthers* numerous, yellow, contorted into a round terminal head.

FEMALE. *Calyx* as in the male. *Ovarium* superior, oblong, four-sided, erect. *Style* none. *Stigma* sessile, peltate, four-lobed. *Capsule* oblong, somewhat curved, four-angled, deeply furrowed at the sides, four-celled, four-valved, the valves septiferous in the middle, many-seeded. *Seeds* long, linear, membranaceous, and acute at both ends, arranged longitudinally, and affixed by the base to the partitions.

OBS. This is the largest and most magnificent species of the genus, being adorned with two kinds of urns, both elegant in their forms, and brilliant in their colouring. It was first discovered with the following species in the forests of Singapore by Sir T. Stamford Raffles, Lieut.-Governor of

Sumatra, when he established a British Colony on that island, in February, 1819. To him, therefore, it is justly dedicated.

NEPENTHES AMPULLARIA. *W. J.*

Caule basi repente surculos urniferos promente demum erecto foliifero, cirrhis foliorum muticis, ascidiis petiolatis confertis inflatis antice membranaceo-alatis, ore coarctato subrotundo striato, operculo lanceolato reflexo postice tricuspide.

Found along with the preceding in the forests of Singapore, also at Rhio, on the island of Bintang.

Root fibrous. *Stem* repent at the base, becoming erect, and supporting itself on the neighbouring trees, round, covered with a deciduous ferruginous down, urn-bearing at the base, and leaf-bearing above. The urn-bearing shoots or suckers are short and spring from the repent part of the stem; they are entirely sheathed by the crowded petioles of the urns, which are dilated and amplexicaul at the base. The *urns* or *ascidia* are supported on short straight petioles; they are erect, ovate, inflated, green and spotted with purple, furnished anteriorly with two longitudinal, membranaceous, fimbriated wings; mouth somewhat contracted, striated, of a uniform yellowish green colour, and nearly round, the inverted margin being prolonged further into the interior of the cup than in the other species. The *Operculum* is lanceolate-oblong, generally reflexed, tricuspid behind the hinge. It opens at an early stage, and as the urn enlarges, it becomes much too small to reclose it. The *leaves* come on the erect part of the stem, and are alternate, subpetiolate, lanceolate, from eight to twelve inches in length, very entire, somewhat reflex at the margin, smooth above, covered with a ferruginous tomentum beneath, particularly on the nerves, terminating at the apex in a tendril, which is generally thickened and revolute at the extremity; the lower ones have sometimes urns similar to those at the base of the stem. The *Racemes* are at first terminal, and afterwards, as in the other species, lateral and oppositifolious, erect, pyramidal, many-flowered; the lower pedicels three to four-flowered, the upper one-flowered. The *Bracts* are linear, acute, and villous like the raceme.

MALE. *Calyx* four-parted, flat, ferruginously tomentose without, green and smooth within, segments ovate, rather acute, two opposite ones larger. *Corolla* none. *Stamineous column* central, erect, nearly as long as the calyx. *Anthers* about eight, yellow, two-celled, compacted into a globular head.

FEMALE. *Calyx* the same as in the male. *Ovarium* superior, oblong, erect, four-sided. *Style* none. *Stigma* peltate, four-lobed. *Capsule* oblong, narrow at both ends, four-angled, four-celled, four-valved, many-seeded, valves septiferous. *Seeds* linear, paleaceous.

OBS. This species differs strikingly in habit from the others, in having the urns crowded near the surface of the ground. They are also very different in shape, being somewhat of the form and size of an egg, inflated like a bladder, and the membrane thinner and more delicate than in the other species. The inverted rim is broad, and projects far into the cavity of the cup, forming a trap in which numbers of flies and insects are taken.

NEPENTHES PHYLLAMPHORA.

Foliis petiolatis oblongis, ascidiis nudis basi subventricosis crassiusculis, superne citius marcescentibus, ore striato depresso, racemis longissimis, pedicellis unifloris.

Cantharifera. *Rumph. Amb. V. t.* 59.

Phyllamphora mirabilis. *Lour. Fl. Coch. p.* 606.

Abundant in moist places and ravines in the neighbourhood of Bencoolen and other parts of the West coast of Sumatra.

It is a larger and stronger plant than the *N. distillatoria*, and has the striated margins of the urns flattened, depressed, and more everted.

NEPENTHES DISTILLATORIA.

Foliis sessilibus amplexicaulibus, ascidiis infundibuliformibus nudis, ore striato.

At Singapore, Malacca, &c.

Poiret seems to have fallen into an error in describing the urns of this species as having smooth margins (*Ency. Méth. II. p.* 459.), I have never met with any that were not striated, though they are less remarkably so than in the other species.

Bencoolen, August, 1820.

CONTRIBUTIONS TOWARDS A FLORA OF VAN DIEMEN'S LAND.

From Collections sent by R. W. Lawrence, Ronald Gunn, and Thomas Scott, Esqrs.

(*Continued from p.* 258 *of the Journal of Botany.*)

In the Journal above mentioned, I spoke with peculiar satisfaction of two gentlemen, resident in Van Diemen's Land, R. W. Lawrence, and Ronald Gunn, Esqrs., who were devoting their leisure time most zealously towards obtaining a knowledge of the National History, and especially of the Botany of that distant and most interesting portion of Australia; and I also prefaced the first memoir which I published on their discoveries, with an account of an excursion made to the Western Mountains of Van Diemen's Land by the latter of these gentlemen. Little did I think that at the very time I was preparing his MSS. for the press, not only himself, at the early age of twenty-six, but his wife, were both, in the short space of a fortnight, suddenly removed from all sublunary enjoyments. The intelligence was communicated to me in the following extract of a letter from Mr. R. Gunn, bearing date "Launceston, Van Diemen's Land, November 15, 1833.

"It is with feelings of the deepest regret I have to communicate to you the death of our mutual friend, Mr. R. W. Lawrence. This melancholy event took place at Formosa, on the night of the 18th October last, the day on which he had attained his twenty-sixth year, and the first anniversary day of his marriage. Twelve months ago poor Lawrence married a young and highly amiable lady, with whom he lived in the most happy state it is possible for mortals to enjoy in this world; and on 2nd Sept. last, I left them, after a short visit, both in the enjoyment of excellent health; next day Mrs. Lawrence was safely delivered of a daughter, but from delicacy of constitution, or too sudden an exposure after her confinement, she was in a few days seized with a fever which terminated fatally within a month—fatally to Lawrence's happiness and peace. After her funeral I brought him into town with me, and amused him in various ways, and he spoke with great pleasure of the satisfaction you had expressed in your last letter, relative to his collections, and your intention of publishing them. On 8th October, I accompanied him some miles out of town on his return, and many arrangements for the future were made; but in a few days after, he was found apparently sleeping in his bed, having been carried off in a fit of apoplexy. Within one fortnight he and his wife were buried! You must excuse my enlarging upon this melancholy subject:—I was, I may almost say, his only friend on earth, and we were brothers to each other—our pursuits and feelings alike; and it will be long ere I shall be able to fill the blank his death has made. I owe much to his memory, as he led me to commence the study of Botany, in which I have spent many happy hours, and yet look forward to years of pleasure in the same pursuit. His loss to you will also be most severe, as he was years a-head of me, in experience, both of Botany and the localities of the plants of Van Diemen's Land. I can only, however, promise to do *all I can,* and trust time will improve me."

As much as possible, Mr. Gunn has exerted himself to fill up the loss occasioned by the death of his lamented friend; and the close of the last year brought me another beautiful and extensive collection from him, an account of which, together with the remainder of those previously sent, it will be no less my pleasure than my duty to lay before the public. The present collection contains some additional species, belonging to the Orders already treated of in the Journal above quoted, together with others, which have enabled me to offer

some corrections or alterations in those already described. These I shall notice in the first instance.

RANUNCULACEÆ. *Juss.*

1. Clematis *blanda*, Hook, l. c. p. 241.—Leaflets varying much in size, from three-fourths of an inch to three inches. Fruit with long awns, copiously silky. In a richer soil, the leaflets are much elongated, and frequently deeply laciniated, the segments pointing upwards, the flowers twice and thrice as large, so that I can hardly conceive a more desirable plant for cultivation in our gardens. A species apparently distinct, but allied to this, is sent by Mr. Gunn, with leaves two to four inches long, ovate and lanceolate, simple or ternately divided, distinctly toothed at the margin, purple beneath. Unfortunately, the flowers are as yet unknown.

2. C. *gentianoides*, De Cand.—Beautiful specimens of this are now sent by *Mr. Gunn*, with fruit—the awns are long and very silky.

6. Ranunculus *glabrifolius*, Hook, l. c. p. 243.—β. *gracilior*; petiolis elongatis, foliorum segmentis longioribus magisque acuminatis.

This species is a very remarkable one. Its roots are fibrous, but a main fibre often bears a tuber, and this sends out a runner which throws up a new plant. The carpels are nearly globose, wrinkled, longer than the beak or persistent style, which is suddenly curved upwards or inwards. Sometimes the leaves, under a microscope, are seen to bear a few scattered hairs.

7. R. *leptocaulis*, Hook, l. c. p. 244.—Add, *Mr. Gunn* (*n.* 444.)—This often grows in a tufted manner, with many spreading stems. It inhabits swampy places.

8. R. *scapigerus*, Hook, l. c. p. 244.—Beautiful specimens of this most distinct plant are now sent from Deloraine, thirty-five miles west from Launceston. The beak and margin of the carpels are deep purple.

DILLENIACEÆ. *D C.*

2. (*bis.*)[1] Pleurandra *hirsuta*, n. sp.—foliis linearibus acutis marginibus revolutis (sed non ad costam attingentibus) sericeo-hirsutis, floribus axillaribus sessilibus solitariis, calycibus totis dense sericeis. *Mr. Gunn* (*n.* 445.)—Gathered on dry hills, near Hobart Town, by *Mr. Backhouse.*—A dwarf plant resembling *P. densiflora;* but the leaves and flowers are smaller and more silky; the flowers are solitary, and the calyx is very silky.

4. P. *ovata*, De Cand, l. c. p. 246.—Add *Mr. Gunn*, (*n.* 183.) and Port Arthur, *Mr. Backhouse.*

CRUCIFERÆ. *Juss.*

2. Cardamina *tenuifolia*, Hook. l. c. p. 247.—Specimens of this are sent by *Mr. Gunn*, (*n.* 447.) two feet in height, and showing that the leaflets of the radical leaves are ovate, or round and petiolate.

3. (*bis.*) C. *heterophylla*, n. sp.—glabra, foliis radicalibus sublonge petiolatis, extimis cordatis integris, integerrimis reliquis pinnatisectis segmentis remotis ovato-cordatis perpaucis sinuato-dentatis terminali maximo, caulinis 1—2 pinnatifidis laciniis linearibus, corymbis paucifloris, siliquis erectis linearibus gracillimis, stigmate sessili.

Wet places, *Mr. Gunn*, (*n.* 446.) Four to six inches high. Flowers rather large, white.[2]

3. (*ter.*) C. *nivea*, n. sp.—glabra, foliis interrupte pinnatisectis, segmentis numerosis ovatis cordatisque sinuato-dentatis basi angustatis in rachidem decurrenti-

[1] Those marked "*bis*," "*ter*," or with an (*), are additional species.

[2] Nearly allied to this is a N. Holland species, which I have already mentioned under *C. tenuifolia* in the Bot. Journal, and which may be thus distinguished: C. *lilacina*, n. sp.—glabra, foliis omnibus pinnati-sectis radicalium segmentis paucis cordato-rotundatis sinuato-dentatis, terminali majori, caulinorum 1—2 segmentis linearibus, corymbis multifloris, siliquis erectis linearibus gracillimis, rostro attenuato.

Hab. Road to Bathurst and Clarence's hilly range. *Mr. A. Cunningham.* Banks of the Macquarrie. *Mr. Fraser.*—Flowers, large, lilac.

bus, caulinis segmentis paucioribus angustioribus, supremis linearibus integris, corymbo multifloro, siliquis (immaturis) linearibus, rostro attenuato. *Mr. Gunn.* (*n.* 401.) A tall (one to two feet high) and rather stout plant, remarkable for the copious segments of the leaves, which are alternately larger and smaller, and occupy almost the whole rachis. The flowers are large, pure white. Pods immature, but decidedly rostrate.

1.* Coronopus *didyma,* Sm.—*Senebiera pinnatifida, D C.—β. incisa, D. C.*—Waste ground, common, *Mr. Gunn.* (*n.* 545.)

VIOLARIEÆ. *D C.*

3. (*bis.*) Viola *Sieberi,* caulibus stoloniferis densis, foliis fasciculatis obovatis cuneatis seu rhombeis crenato-serratis longe petiolatis, stipulis lanceolatis subdentatis, pedunculis folio sub brevioribus.—V. spathulata. *Sieber, Fl. Nov. Holl. n* 426. (not *Willd.*) *Mr. Gunn* (*n.* 95?) very properly looks upon this as distinct from V. *hederacea:* it is however probably the V. *hederacea, β., foliis basi subcuneatis,* of Labill. and De Candolle. Our plant is scarcely two inches high, densely tufted, bearing short stolones and numerous flowers nestled among the leaves.

1.* Hymenanthera *angustifolia,* Br. in De Cand. Prodr. v. 1. p. 315, *Mr. Gunn,* 1835. (*n.* lost.)—A very harsh-looking shrub, with virgate branches, and quite entire evergreen leaves, exceedingly different from the *H. dentata, Bot. Mag.* t. 3168.

DROSERACEÆ. *D C.*

To the Genus *Drosera* I have now the pleasure of adding two more species, natives of Van Diemen's Land.

2. (*bis.*) Drosera *lunata, Buch. in De Cand.,* Prodr. v. 1. p. 319.—Well distinguished from *D. peltata* by the entirely glabrous calyx. If our plant be the same as the Indian one, the species has pink flowers, and the roots often bear a solitary tuber, as large as a small hasel-nut. The radical leaves, both in this and in *D. peltata,* are not peltate, but inserted by the margin to the petiole and are reniformi-cordate. Some of the specimens are branched, and twelve or fourteen inches long.

2. (*ter.*) D. *Menziesii,* Br. in De Cand., Prodr. v. 1. p. 319.

Mr. Gunn, (*n.* 449.):—discovered by *Mr. Backhouse,* at Swan Port, on the East coast of Van Diemen's Land.

POLYGALEÆ. *Juss.*

3.* Comasperma *calymega*—Labill. Nov. Holl. v. 2. p. 159.

Port Arthur. *Mr. Backhouse.*—A small species, well figured by Labillardière, except that the figure represents a midrib, which is not apparent. The leaves are of a thick texture, very glossy. Flowers in a small, elongated, dense raceme. Cor. deep blue.

TREMANDREÆ. *Br.*

Mr. Gunn observes with regard to his Nos. 21 and 193, included under *Tetratheca pilosa, Labill.* l. c. p. 248, (by mistake marked *n. sp.,*) that the two plants come from two different localities; *n.* 21 being found at Launceston; *n.* 193 in the western parts, where the climate is much colder. But I can see no difference between them, except in the greater or less degree of hairiness or hispidity. Indeed, from the numerous specimens with which this liberal friend has favoured me, I am more than ever satisfied, that the three varieties I have indicated, deserve no higher rank: and it is even probable that the *T. ericæfolia* of Sieber is not really distinct from it. Nothing can exceed the beauty of some of our specimens, loaded as the branches are with the deep and bright rose-coloured blossoms, marked with the dark eye formed by the stamens. I should observe, that the specimen of n. 193, now sent by Mr. Gunn (from the Hampshire Hills), is far more hispid than that what came before under the same number.

PITTOSPOREÆ. *Br.*

1. Billardiera *scandens*, Salisb.; l. c. p. 249, should be altered to *B. mutabilis*, the fruit being oblong, and quite glabrous.

To *B. longiflora*, may be added, as a synonym, *B. ovalis*, Lindl. Bot. Reg. t. 1719.—The flowers are very variable in size; some of *Mr. Gunn's* specimens being twice as large as others. The species is readily distinguished, both from *B. scandens* and *B. mutabilis*, by its almost entirely glabrous leaves, globose fruit, and the straight obtuse petals.

1. Bursaria *spinosa*, l. c. p. 249.—*Mr. Gunn* observes that the plant does bear spines, not unfrequently; so that it only appears to differ in its much larger size from the N. Holland plant. No. "115" of *Mr. Gunn*, should, I believe, have been given as No. 15.

1. Pittosporum *bicolor*, l. c. p. 249, is gathered by *Mr. Gunn*, on the Hampshire Hills.

2.* P. *procumbens, n. sp.*—pumilum glabrum, ramis procumbentibus, foliis sparsis erecto-patentibus oblongis mucronatis lævibus marginibus revolutis, floribus terminalibus subsessilibus, petalis acuminatis rectis.

Mr. Gunn (*n.* 151.)—A dwarf spreading shrub, scarcely a span across: its wiry branches clothed with copious foliage. Peduncle short, terminal. Sepals subulate, almost as long as the straight petals.

3.* P. *nanum*, n. sp.—pumilum erectum? pubescenti-scabrum, foliis sparsis erecto-patentibus lineari-lanceolatis mucronatis marginibus revolutis, floribus terminalibus aggregatis, pedunculis flore longioribus, petalis acuminatis rectis.

Mr. Gunn (*n.* 617.)—Discovered by *Mr. Backhouse*, but the locality is not mentioned.

1. Linum *angustifolium*, l. c. p. 249.—Under this should have been given, *Mr. Gunn* (*n.* 71.), who finds it on the Hampshire Hills.

3.* Stellaria *flaccida*, n. sp.—caule elongato debili ramoso nitido glabro, foliis ovato-lanceolatis acutissimis ciliatis in petiolum brevem attenuatis, pedunculis axillaribus solitariis folio ter longioribus, petalis bipartitis sepalis glabris uninerviis marginibus albidis longioribus.

Mr. Gunn (*n.* 450.)—Nearly allied to *S. media*; but it is a much larger plant, from one to two feet in length, less succulent. The stems are very glossy, and destitute of the alternate hairy line which so beautifully marks our European plant; the flowers are much larger, and the peduncle much longer. It bears flowers nearly the whole length of the stem.

4.* S. *multiflora, n. sp.*—glaberrima, caulibus e basi ramosissima decumbentibus, foliis sessilibus lanceolatis acutissimis basi coadunatis, pedunculis terminalibus axillaribusque (ex omni nodo) solitariis erectis foliorum longitudine, sepalis lanceolatis acuminatissimis obsolete 3-nervibus, petalis deficientibus.

Mr. Gunn (*n.* 451.)—A small plant, branching excessively from the root, and decumbent: very distinct from any species with which I am acquainted. Every pair of leaves produces a flower, for the whole length of the stem and branches. The petals seem to be wanting in all the flowers. Capsule ovate, as long as the calyx, splitting at the apex into six revolute teeth. Seeds globose, beautifully dotted and tuberculated in lines.

1. Cerastium *vulgatum*, L.—Sent without number or particular habitat. An introduced plant, probably.

BOMBACEÆ. *Kunth.*

1. Plagianthus *sidoides*, Hook, in Bot. Mag. t. 3396.—Sida discolor. *Hook l. c. p.* 250.

Mr. Gunn (*n.* 452.), who remarks on it, that it "flowers in March and April, a most unusual season for the blossoming of plants in Van Diemen's Land." The great similarity in the foliage and inflorescence of this with those of *Sida pulchella*, led me at first to refer it to that genus. It has now flowered in the Glasgow Botanic Garden, and I have no doubt of its belonging to the little-known genus *Plagianthus*, of which the only two species we are

acquainted with, are figured in the Bot. Mag. (the P. *divaricatus*, at t. 3271.)

BUTTNERIACEÆ. *Br.*

1.* Lasiopetalum *discolor*, n. sp.—foliis breviter petiolatis cordato-ovatis obtusissimis supra pubescentibus subtus albo-tomentosis, ramis petiolis calycibusque ferrugineo-tomentosis, cymis parvis capitatis.

Mr. Gunn (*n.* 551.)—Discovered by *Mr. Backhouse*, on Prince Seal Island, Basse's Straits.

HYPERICEÆ. *Juss.*

1. Hypericum *involutum*, Chois.—Hook. l. c. p. 251.—Add. *Mr. Gunn* (*n.* 73.)

GERANIACEÆ. *Juss.*

2. Geranium *parviflorum*, *Willd.—Hook. l. c.*—Add *Mr. Gunn* (*n.* 453.)

OXALIDEÆ. *D C.*

2.* Oxalis *lactea*, n. sp.—acaulis parce pilosa, foliis longe petiolatis ternatis, foliolis obcordatis utrinque lævibus, scapo petiolis sublongiore supra medium bibracteolato unifloro, flore erecto.

Mr. Gunn (*n.* 370.)—Good specimens of this, together with the remarks of *Mr. Gunn*, have satisfied me that it is quite distinct from *O. macrophylla* (with which I had confounded it). It is more allied to *O. acetosella*.

ZYGOPHYLLEÆ. *Br.*

1*. Zygophyllum *Billardieri*, De Cand. Prodr. v. 1. p. 705.

Flinders' Island, Basse's Straits. *Mr. Backhouse. Mr. Gunn's* collection (*n.* 552.)—A most distinct species, of which the flowers were unknown to its only describer, Prof. De Candolle. These are octandrous, with four petals, and eight stamens. The fruit is exactly cuneate, deflexed, flattened, with two broad wings on each side. The plant is perhaps not uncommon in N. Holland. I possess specimens gathered by Mr. Cunningham, on "alluvial banks of the Erskine River, lat 32. S.;" and from King George's Sound, gathered by Mr. Baxter.

RUTACEÆ. *Juss.*

2. Corræa *virens*, Sm. Ex. Bot. v. 2. p. 72. Hook. l. c. p. 253.—By mistake, this was marked *n. sp.* in the former paper, on *Mr. Gunn's* plant.

3. C. *Backhousiana*, Hook. l. c. p. 253. Of this most distinct species, other specimens are now sent by *Mr. Gunn* (*n.* 456.) from Woolworth, N. W. corner of the island; and one of the V. D. L. Co.'s Establishments. These show that the leaves are sometimes impresso-punctate on the upper side; and that Mr. Cunningham's plant, found at Hobart Town and Marquarrie Harbour, is the same.

4. (*bis.*) C. *ferruginea*, *n. sp.*—foliis erectis? ovali-lanceolatis obtusissimis in petiolum attenuatis integerrimis supra viridibus glaberrimis lævibus impresso-punctatis subtus stellato-tomentosis ferrugineis, floribus 1—3 terminalibus cylindraceis pendulis, dentibus calycinis acutis, staminibus longe exsertis. —C. ferrugine, *Gunn MSS.*

Mr. Gunn (*n.* 557.)—This handsome species is sent by *Mr. Gunn*, with the name (hitherto unpublished, as far as I know) of *ferruginea* attached to it, which is here retained. The leaves are the largest of any of the species, often two inches and more in length, always acute, or attenuated at the base, the underside copiously clothed with stellated rusty tomentum, marked with deeper coloured dots. The flowers are longer, and much more slender than in *C. Backhousiana* (next to which species it should be placed), and the stamens are much exserted. The young shoots are very red.

1. Phebalium *retusum*, Hook. l. c. p. 254. —Copious specimens of this plant from *Mr. Gunn* (*n.* 455.) exhibit all the characters of the species, and prove that it is truly distinct from the following. It is very abundant on the banks of the South Esk, near Launceston, growing six or seven and more feet high. *Mr.*

Backhouse also finds it at Prosser's River, on the East coast.

2. (*bis.*) P. *Billardieri,* Adr. Juss. — *P. elæagnifolium,* Sieb. Fl. Nov. Holl.— Eriostemon squammeum. Labill. Nov. Holl. v. 1. p. 141.

Mr. Gunn (*n.* 454.)—This is the true plant of Labillardière, whose original specimen is from Van Diemen's Land. The New Holland state of it, which M. Sieber has published, under the name of *P. elæagnifolium,* and which Mr. Cunningham finds in the Blue Mountains, has the corymbs with more flowers, and of a smaller size; the underside of the leaves, too, is whiter and more silvery.

1. Boronia *tetrathecoides,* Pers.—*B. hyssopifolia,* Sieb. and Hook. l. c. p. 255. *Mr. Gunn* (*n.* 458.)—This is very near *B. pilonema* of Lab. but in that the flower is always terminal (here constantly lateral), and the filaments are naked.

3. B. *variabilis,* Hook. l. c. p. 255. — The last collection received from *Mr. Gunn,* so rich in good specimens, enables me to correct my ideas respecting *B. variabilis,* and to refer the varieties α. and γ. to *B. tetrandra,* Labill., notwithstanding the flowers are octandrous. The name of *variabilis* will be confined to the var. β., which has the leaves very generally *bipinnate,* the leaflets oblanceolate or cuneate, entire or trifid, marked with evident glandular dots. The branches have two opposite lines of hairs. A species nearly allied to this is the *B. anethifolia* of Cunningham's MSS., found by that enterprising Naturalist, on the West branches of Hunter's River, and in Wellington Valley; but the stems are remarkably angular, the leaflets acute, the flowers more numerous on the peduncle.

4. B. *tetrandra, Labill. Nov. Holl.* v. 1. p. 125. (sed in nostr. exampl. floribus semper octandris).—*B. variabilis,* α. Hook. l. c.

RHAMNEÆ. *Br.*

3. Pomaderris *racemosa,* Hook. l. c. p. 256.—*Mr. Gunn* (*n.* 461.)

3. (*bis.*) P. *obovata, n. sp.*—foliis obovatis retusis integerrimis marginibus revolutis supra nudis subtus albo-fuscescenti-lanatis, floribus glomerato-capitatis sessilibus bracteatis terminalibus foliosis, petalis cucullatis patentibus.

Mr. Gunn (*n.* 460.) — Discovered by *Mr. Backhouse,* at Meredith River, Swan Port, E. coast. This is still more nearly allied to *P. betulina* (*Cunn. in Bot. Mag. t.* 3212.) than is our *P. racemosa;* but the leaves are decidedly obovate, and the flowers are not apetalous.

(To be continued.)

ON THE MEDICINAL PLANT, CALLED CUICHUNCHULLI;

Extracted from a Memoir, entitled, "Observations on the *Cuichunchulli,* and its use as a remedy in the disorder called *Mal de San Lazaro,* or *Cocobay.* By EDWARD NATHANIEL BANCROFT, M. D., Fellow of the Royal College of Physicians, London."

(Read before the College of Physicians and Surgeons of Jamaica, on the 19th January, 1835.)

(I had already seen some notice of the powerful effects of the roots of this plant, in our Journals; and on the 19th of the present month, Feb. 1836, I had the pleasure of receiving the following letter from Dr. Bancroft; accompanied by the pamphlet there alluded to; and by specimens of the root, with its leaves and flowers, dried without pressure, but in a sufficiently perfect state to enable me to determine the species in the most satisfactory manner.

"Kingston, Jamaica, Dec. 29, 1835.

"My Dear Sir,—I am very sorry that indifferent health and a great want of leisure have so long suspended my communication with you, for I have frequently wished to lay before you such information as seemed to me novel, and which I therefore hoped might prove worthy of your attention. I have lately been induced to write and publish a memoir on a plant, called *Cuichunchulli,* whose botanical history had been hitherto unknown:—it is found in Quito, near the foot of the great volcano of Chimborazo, and is only recently come into notice, from its supposed virtues as a remedy for that horrible disease, too frequent in tropical regions, the *Mal de*

San Lazaro, the Elephantiasis or Satyriasis of the Greeks. After various endeavours, and as many delays, I finally succeeded in obtaining samples of the plant, which enabled me to ascertain its characters, and at the request of several persons here, I have published these, together with such observations on its medicinal powers, as I had either witnessed myself or collected from others. I forward to you a copy of my paper on the subject, printed in the last number of the Jamaica Physical Journal, and enclose with it some of the best specimens of the plant that I have received from Riobamba, together with its seeds; believing that you will not be displeased at being made acquainted with a new plant, which may hereafter prove highly valuable to the human race. Should you do me the favour to examine the plant, and to compare your results with my description, I trust you will be so kind as to correct whatever you may find defective in the latter; and in case you should feel disposed to give a figure of it in the Botanical Magazine, I send you a magnified drawing of the flower, which I made, partly from my own examination, and partly from Signor Marcacci's account of it, as seen by him, which, he said, represented correctly the colours and bearing of the flowers."

(Signed) "E. N. Bancroft."

Dr. Bancroft has great merit in endeavouring to ascertain the real properties of this plant, and for taking so much pains to separate the truth from those false statements which have undoubtedly been given through ignorance or fraud. I shall omit the accounts of the particular effects produced by this medicine upon the patient, which are more suited to a Medical than a Botanical Journal; and, with regard to the plant itself, I have only to observe, that after comparing it carefully with Humboldt's full description, drawn up from original Colombian specimens of *Ionidium parviflorum*, Vent. (*Viola parviflora*, of Mutis and Linnæus) received from Mutis himself, with the excellent figure and description given by St. Hilaire, in his "*Plantes Usuelles des Braziliens*, t. 20," and with my own specimens from the North of Chili (Conception), mentioned in the *Botany of Capt. Beechey's Voyage*; I have no hesitation in pronouncing it to be the same. It is the *Maytensillo* of *Feuillé*, *Fl. Chil.* v. 3, p. 41, t. 28, a name, with the exception of the first letter, which is perhaps an error in the orthography, evidently identical with that which is applied to our plant; and that author observes of it, that the root is similar to that of *Ipecacuanha* in shape, and employed in lieu of *Senna*, it being considered one of the most sovereign purgatives of the country. Cavanilles (Icones, v. 6. p. 21) has noticed it, as having been found at Montevideo, in Quito, and in Chili; thus it appears to have a most extensive range on the Southern Continent of the new world. St. Hilaire is of opinion that the *Ionidium glutinosum* of Ventenat, a native of Buenos Ayres, should be united with it; and the *I. microphyllum* of Humboldt scarcely appears to differ from it, except in all the leaves being opposite. Dr. Bancroft is disposed to consider the *Cuichunchulli* a species distinct from *parviflorum*, chiefly on account of the supposed absence of the two nectariferous scales: but although they are very minute, they are unquestionably present, exactly as in *I. parviflorum*, situated at the base of stamens, between them and the lower lip. He proposes that it should have been called *I. Marcucii*, in honour of M. Jean Batiste Marcucci, a French gentleman, whose indefatigable exertions, as mentioned below, undertaken, in order to procure the Cuichunchilli, certainly entitle him to such a distinction.)

"The attention of the public," Dr. Bancroft observes, "throughout Colombia, has lately been excited by accounts published in various Journals, relative to a plant named *Cuichunchulli*,[1] which is stated to

[1] This is the nearest approach than can be made in Spanish orthography to the proper, *i. e.* the *Indian*, mode of pronouncing the word: but it is faulty in the penultimate syllable. It should be sounded as consisting of five syllables, and spelt, for English pronunciation *Coo-y-rhoom-jool-ye*; for French *Cou-y-tchoune-djouilli*; and for Italian *Cu-y-cum-gui-gli.*

have afforded great benefit in the disorder there usually called *Mal de San Lazaro*, and here *Cocobay*, and even to have effected its cure. As this is one of the most deplorable diseases that can affect the human frame, I am persuaded that no apology will be requisite for bringing forward some authentic reports on the subject, together with such additional information, concerning both the plant itself, whose Botanical characters I have been able to ascertain, and its properties, as it has been in my power to collect from different quarters, or by personal observation.

"It appears that a Jesuit of Quito, named Velasco, a native of Riobamba, in that province, whence he was afterwards expelled with the rest of his brethren, and permitted to retire into Italy, had occupied himself with writing a history of Quito, which the unremitting persecution kept up against the whole Order, finally deterred him from making public. At his death, the work fell into the hands of his executor, another Jesuit, whence it passed into those of Don Modesto Larrea,[1] a Colombian, who chanced to be in Italy, and who carried it back with him to Quito." The following passage relates to the plant now under consideration:—

"*Cuichunchulli*, a name signifying in the language of the Incas, bowels of a Guinea Pig, *Tripa de Cuy*, resembles a small, whitish, slender nerve, destitute of leaf, which rises from beneath stones, and fastens itself to their surface. Scarcely any plant is more potent. Its virtues, though long familiar to the Indians, were unknown to the Spaniards, till 1754, when an Indian revealed them as a singular favor to a lay Jesuit, then suffering under confirmed Leprosy (*Elephantiasis tuberculata*,) with all the symptoms and appearance of a Lazar, and pronounced in a hopeless state by the physicians. He gave him half a drachm of the nerve-like filament, ground and mixed with wine, but warned him first to receive the Sacraments. Its operation was attended with extreme agony during twenty-four hours, when the surface of his body became clean and dry. A few days after, he began to cast his skin piecemeal, and and recovered perfectly. Of all which, says Velasco, 'I was an eye-witness in the city of Cuenca.'"

"The above statement having been extracted, and published by a Newspaper printed at Bogota, in 1829, it came to the knowledge of a practitioner at Maracaybo, Señor Manuel de Arocha, whose desire to make trial of the *Cuichunchulli* induced him to beg the assistance of many friends to procure it for him; in which he succeeded, in consequence of accidentally applying to a Colonel Casanova, one of whose own relatives was afflicted with this disease, the *Mal de San Lazaro*. Immediately on receiving the *Cuichunchulli*, Señor de Aroche commenced by trying it on a person of colour, named Puche, long and dreadfully afflicted with this disorder, and afterwards administered it to Don Angel Casanova, keeping an accurate and detailed journal of the principal occurrences which he observed in each case. An authentic copy of this document, drawn up and signed by this practitioner, is now before me, from which it appears that in both instances the exhibition of the remedy was discontinued from the whole stock having been expended, a portion having been generously spared by Señor de Casanova to a young lady, named Maria Antonio Macpherson, living in Caracas, and similarly affected with the *Mal de San Lazaro*. In all these instances, though the trial of the *Cuichunchulli* was cut short from the insufficiency of the supply, the effects were more or less beneficial, and highly so, both as regarded Puche, and Miss Macpherson. That they, however, fell so far short of the extraordinary cure performed in the case of the Jesuit, may be partly accounted for by the circumstance that possibly the plant used by the latter might not be exactly identical with the *Cuichunchulli*. Velasco could have possessed no great knowledge of plants, else he would at once have per-

[1] This gentleman, afterwards Vice President of the State of the Equator, is particularly mentioned in the late Colonel Hall's Journal. See pp. 67, and 70, of the present vol. of this Work.

ceived that the nerve-like filaments which the Indian succeeded in making him believe to be the entire plant, were roots only, and therefore "without any leaves." This was doubtless a deception resorted to for the purpose of preventing the Jesuit from discovering the real plant; for it has been the constant practice of the aborigines, and is so, as I am assured, till the present day, to enwrap in mystery and concealment every vegetable or other production of their country, which they believe to possess particular uses or virtues. It may also be matter of question, whether the cure of a disease of four years standing, accompanied by the foulest ulcers, could possibly be effected in a few days by a single dose of any medicine, however potent; and though the good father declares that he was an eye-witness of it, yet when we come to consider the dreadfully contagious nature of Leprosy, it seems hardly probable that Velasco would run the risk of personally visiting and watching the lay brother while in so advanced a stage of that loathsome complaint. The Indian would, of course, magnify the virtues of his specific, and the rapidity of the cure; and Velasco, who saw the amendment in the patient's state, would, without any other intention than that of recording the virtues of the plant, promulgate, unintentionally, a highly exaggerated account.

"To return, however, to my more immediate narrative. M. Marcucci, a French gentleman, resident at Maracaybo, having heard of Puche's improved condition, and verified it by personal and frequent inspection, was so much struck by the virtues of the *Cuichunchulli*, that not apparently aware of its weaker influence in the case of Señor Casanova, and hoping to benefit mankind in general, and to derive some personal advantage for the support of his own large family, he at once made up his mind to go in search of the plant that produced it. As no vessel then offered for Jamaica, he had, in January, 1834, to go coastwise to Sasarida in Coro, to Rio Hache, and to Aruba, in order to reach this island, whence he soon proceeded to Chagre and Panama. There, after a long detention, and in despair of a direct opportunity for Guayaquil, he was forced to embark in small coasting vessels, going occasionally in directions very different from his own, being almost always exposed to great privations, to personal hardships, and frequently to the various perils that attend this sort of navigation. At length, when M. Marcucci succeeded in reaching the coast of the Equatorial State, he found the country so involved in civil war, as completely frustrated his attempts to penetrate into the interior, the hostile parties taking him for a spy, and compelling him to retrace his steps towards the sea. In the end, unable to overcome the obstacles that met him every where in that distracted country, he resolved to make a wide circuit by way of Peru, and finding an American whaler at Tumbez, bound to Payta, he went on board, and on landing there, proceeded to Puira, travelling for many days over the heated sands; and thence, crossing the Province of Loxa, he was enabled to enter the State of the Equator, by roads almost impassable; over mountains of astonishing elevation, and extremely cold temperatures; living for a month on the food of savages, and halting in Indian huts, which swarm with vermin, from which no precautions can preserve the traveller. Thus harassed, and bruised withal by the fall of his horse, while descending an unusually steep and slippery path, he arrived at Cuenca, where his first care was to inform himself as to the *Cuichunchulli*. Indians were presently brought him, who assured him that they knew the plant perfectly, and brought him specimens of it, which many trials of its effects upon himself, proved to be perfectly inert. All his researches in the deserts of Pasul and Tzincocha, &c., which consumed much time, and occasioned great fatigue, were equally fruitless, and the poor man was returning homeward in deep affliction at the total failure of his enterprize, when he had the satisfaction of learning that Señor Borrero, the Postmaster-General of the District, who resided at Cuenca, had recently administered a medicine bearing the same

name, to a son and daughter of his own, who had been suffering severely with leprosy for five or six years. Upon this, M. Marcucci waited on that gentleman, who informed him that he had tried, without success, the *Cuichunchulli*, obtained both in that neighbourhood, and in the colder district of Cañar; but that his children had derived the greatest benefit from some which was brought from Riobamba, in the province of Chimborazo. In both the individuals, sensation has been restored in the diseased parts; the ulcers have healed, and the joints are become flexible, great improvement having also taken place in their general health. M. Marcucci satisfied himself, by personal inspection, that these patients had derived very considerable advantage from the exhibition of the *Cuichunchulli*, though traces still remained in their countenances of the frightful malady with which they had been stricken.

Possessed of the above highly valuable information, M. Marcucci made immediate preparation for visiting Riobamba; and though first delayed by the progress of the Revolutionary army, and subsequently compelled to make his weary way over chains of mountains covered with eternal snow, through dark, miry, and dismal forests, obliged to climb almost inaccessible heights, the descents of which often menaced him with a broken neck, he succeeded in reaching Riobamba, a small town at the foot of the great volcano of Chimborazo. In his way he met with one poor woman, whose sufferings had been much alleviated by the use of the Chimborazo plant, which her excessive poverty alone prevented her from obtaining in such quantities as might effect a perfect cure. A comparison of the foliage, &c. of the plant which she showed him, proved it to be identical with that which had produced such benefit on Señor Borrero's children.

While in Riobamba, M. Marcucci received all necessary information respecting the plant he was seeking, from the parties who procured it for Señor Borrero, as well as from the Indians; and he collected some quantity of it, which was precious to him, though trifling in amount when compared with the expense, trouble, hazard, and fatigue that he had incurred for its acquisition. A longer stay at Riobamba would, he believes, have enabled him to obtain much more; but, during the whole thirty-three days which he passed there, he suffered from severe attacks of intermittent fever, and was obliged to return to Guayaquil, where he embarked for Payta, thence to Panama, and then came hither. Shortly after his arrival, he did me the favour to place a portion of *Cuichunchulli* in my hands, requesting me to administer it in cases of the *Mal de San Lazaro*, in order to ascertain its medicinal powers; and he likewise, at my request, sent me an account of his voyage, from which I have extracted the foregoing particulars.

M. Marcucci being anxious that my trials of his plant should be made as soon as possible, his stay in Jamaica being limited, I commenced by administering it to five of the most diseased Lazars in the Cocobay Asylum, and afterwards to two other patients, a mulatto woman and a white man. I must premise, that the quantity of the dried plant which I received, when reduced to powder, did not exceed eleven or twelve ounces; that, to make it go further, I had the stems and leaves ground up with the roots (though I have since thought it possible that the medicinal properties may reside in the roots alone); and also that, in consequence of M. Marcucci's being obliged to embark sooner than he expected for Maracaybo, when he took the remainder of the *Cuichunchulli* away with him, my trials of it were necessarily put a stop to, long ere they could be fairly deemed to have had sufficient time to produce their full results.

In every one of the patients whom I treated with *Cuichunchulli*, an improvement in their condition was almost immediately evident; the sensations of heat, and painful tension, which always accompany this direful disease, gave place, more or less, to general ease and comfort; their limbs became lighter and more flexible,

and the sense of touch was partially restored, so that some could handle a knife and fork, or work with a needle, and walk much faster than they had been able to do before. In none, however, did the prompt curative effects take place which were observed in Miss Macpherson and in Puche. The *cure* might be said to have only begun; still it was an inexpressible satisfaction to perceive, that in one of the most obstinate and loathsome of maladies, any sensible amendment, such as that acknowledged by the six patients now under consideration, could be effected during the only five weeks that they took the *Cuichunchulli*. I may also state, that, to put its remedial powers to the most decided test, I abstained from administering every other medicine at the same time; and that the excessively poor diet which the Lazars receive, being only the same with the food allowed to persons confined in the House of Correction, was also unfavourable to their recovery. The case of my white patient remains to be mentioned; and here I am sorry to say, that the *Cuichunchulli* produced no sensible benefit whatever, though my interest in the individual led me to continue it for a longer period, and to administer it in larger quantities than to any of the others. Sometimes, indeed, he said that he thought himself rather better, but that farther reflection speedily dispelled the agreeable illusion. In this instance, therefore, the plant in question has completely failed; but this failure may only serve to confirm the general rule, that no medicine is equally effective in all cases.

E. N. Bancroft.

BOTANICAL INFORMATION.

(*Continued from p. 226.*)

BERKELEY'S FUNGI.

We are happy to announce the appearance of the first part of specimens of "*British Fungi*," of the *Rev. M. J. Berkeley*. As stated elsewhere, this work is to be considered as illustrative of, and supplementary to, the Second Part of the Fifth Volume of the *English Flora*. All information, therefore, as to the character and synonyms of the species, is to be sought in that work. Occasion, however, will be taken of communicating any farther information, which may be deemed requisite, or of correcting any errors into which the author may have fallen, as the different species are published: and new species, or such as may occur subsequently to the completion of the English Flora, will be accompanied by their specific characters; and, where such exist, by their more prominent synonyms.

1. Agaricus *cristatus*, Bolt.—2. *A. Cossus*, Sow.—3. *A. blennius*, Fr.—4. *A. flaccidus*, Sow.—5. *A. nebularis*, Batsch.—6. *A. odorus*, Bull.—7. *A. porreus*, Fr.—8. *A. carneus*, Bull.—9. *A. undatus*, Berk.—10. *A. ramealis*, Bull.—11. *A. epiphyllus*, Pers.—12. *A. polygrammus*, Bull.—13. *A. Fibula*, Bull, and γ. *Swartzii*, Fr.—14. *A. pyxidatus*, Bull.—15. *A. purpurascens*, A. and S. (*callochrous*, Fr.). 16. *A. adiposus*, Batsch.—17. *A. squarrosus*, Müll.—18. *A. mollis*, Schœff.—19. *Merulius Corium*, Fr.—20. *Thelephora byssoides*, Pers.—21. *T. lactescens*, Berk.—22. *T. comedens*, Nees.—23. *Typhula phacorhiza*, Fr. (on *Sclerotium scutellatum*, and, in some copies, also on *S. complanatum*).—24. *T. erythropus*, Fr.—25. *Pistillaria quisquiliaris*, Fr.—26. *Cenangium quercinum*, Fr.—27. *Sclerotium scutellatum*, A. and S.—28. *A. salicinum*, D C.—29. *Sphæria Prunastri*, Pers.—30. *S. fibrosa*, Pers.—31. *S. leucostoma*, Pers.—32. *S. Dothidea*, *b. Rosæ*, Moug.—33. *S. filicina*, Fr.—34. *S. pantherina*, Berk. *n. sp.*—35. *S. Junci*, Fr.—36. *S. fimbriata*, Pers.—37. *S. Lirella*, Moug. and Nest.—38. *S. Gnomon*, Tode.—39. *S. brunneola*, Fr.—40. *Phoma Pustula*, Fr.—41. *Asteroma reticulatum*, Berk. (*Dothidea reticulata*, Fr.).—42. *A. Cratægi*, Berk. (*Actinonema Cratægi*, Pers.).—43. *Rhytisma salicinum*, Fr.—44. *Phacidium carbonaceum*, Fr.—45. *P. Lauro-cerasi*, Desm.—46. *Leptostroma Spireæ*, Fr.—47. *Perichæna populina*, Fr.—48. *Lasiobotrys Loniceræ*, Kze.—49. *Chætomium*

elatum, Kze.—50. *Stilbum piliforme*, Pers. —51. *Pachnocybe subulata*, Berk. (*Periconia subulata*, Nees). — 52. *P. albida*, Berk. (*Sporocybe albida*, Fr.).—53. *Botrytis effusa*, Grev.—54. *Epochnium fungorum*, Fr.—55. *Fusisporium Buxi*, Fr. —56. *Psilonia rosea*, Berk.—57. *Puccinia Bullaria*, Lk.—58. *Œcidium cancellatum*, Pers.—59. *Uredo Iridis*, Dub. — 60. *U. Betæ*, Lk.

WEBB'S AND BERTHOLOT'S NATURAL HISTORY OF THE CANARY ISLES.

A highly interesting work, as regards the Natural History and Botany, in particular, of the Canary Isles, is announced, the result of the researches of *P. Barker Webb*, Esq. and *M. Sabin Bertholot*, in that celebrated region. It is entitled "HISTOIRE NATURELLE DES CANARIES." The two first numbers of this work are now before us; and we shall take an early opportunity of showing the value we set upon it, by offering some extracts to our readers; and, in the mean time, shall lay before them some account of the nature and extent of the publication, as derived from the Prospectus issued in Paris by the editor, M. Bethun.

The Canary Islands have often attracted the attention of Naturalists, on account of the productions of their soil; but though these islands have been visited, at various periods, by learned travellers, they have never been studied in a general point of view. Teneriffe has ever been the chief attraction to scientific individuals; its central situation, its importance, the advantages which the roadstead of St. Croix offers to European vessels, all these circumstances have rendered it a halting point, and are the causes why the other spots of this Archipelago have been neglected. Messrs. Webb and Bertholot have proposed to fill up this gap by the publication of a Natural History of the Canary Islands: part of their work is the result of ten years' assiduous observation; and two successive years of excursions throughout the isles of this groupe, have enabled them to collect and study in detail the productions of the three kingdoms of nature. We proceed to give an analysis of their labours.

M. Sabin Bertholot arrived at Teneriffe towards the close of 1819; ever since this period, his numerous exploratory visits to the different districts of that island, and his first expedition to that of Canaria, permitted him to collect abundant materials. During his long stay, the local authorities were able to appreciate all the interest that would thus accrue to their country; while his intimate acquaintance with the principal inhabitants, and the general good-will that was felt towards him, had accustomed him to regard the Canaries as his adopted land. Having been requested to superintend the college, founded at Orotava, and employed by the Marquis Villanueva del Prado, (the originator of the acclimatization Garden,) to inspect the process of cultivation adopted in this fine establishment, he endeavoured to show himself worthy of this double mark of confidence. But some regulations that were set on foot, by a party inimical to all knowledge, caused the suppression of the college to which M. Bertholot was appointed director; and an ill-disposed jealousy, which frustrated all his efforts, compelled him to abandon the gardens which he had striven to render useful towards the promotion of Horticultural Botany. From that period, the garden at Orotava has been wholly neglected; and our French Naturalist resumed his researches with still greater activity than before, and found, in his studies, that charm and consolation which the acquisition of knowledge alone can bestow. The desire of communicating information respecting a country which he had investigated in every direction, and of presenting, in one great picture, its general history, had occupied him a long time, when, in 1828, a fortunate circumstance afforded him the means of realising his plans by uniting his observations to those of an able fellow-labourer P. Barker Webb, Esq., long known by his acquirements in Natural History, and by his extensive journeys and sci-

entific researches, arrived in the Canaries: their intimacy commenced from that period. Teneriffe was explored anew; and then, during two following years, the principal islands of this Archipelago were successively visited. Rich in numerous collections, and in the drawings of every kind which they executed, these two travellers returned to Europe towards the close of 1830; and the three next years having been devoted to uniting and coalescing their materials, the publication is to be immediately commenced.

After noticing the nature of the Historical Introduction, the Geography, Geology, and Zoology of the Canary Islands, the Editor proceeds to the department of their

BOTANY.

Placed on the confines of the temperate zone, the Canary Islands possess a peculiar Flora: in this latitude, the greater number of the plants assume already a different aspect and character; the species are more developed, woody, and often even arborescent; and some are single types of certain genera, which have hitherto been only seen in these islands. The assemblage of all these peculiarly Canary Island plants, on the limited spot which produces them, renders this country a real region of Botany. Among these varied vegetable forms, there are some which combine the Flora of this Archipelago with that of the Atlantic countries, and especially with Western Africa: others, again, which, by their aspect or generic affinity, approach the inter-tropical plants; while a certain number, belonging to the species of Southern Europe, unite this vegetation with that of the Mediterranean shores. These various considerations render the Botanical Geography of these islands highly interesting, and point out the Canaries as one of those favoured spots on the globe where science can pursue a series of observations with the greatest chance of success. The different stations which the plants occupy, the kind of affinity which seems to unite some species, and the insulated habitats that others affect; the difference of the soil, exposure and the height at which they grow, are all so many considerations which swell the importance of the study, when, after having investigated in detail the scattered vegetation of this Archipelago, it becomes desirable to catch a general view of its distribution.

MM. Webb and Bertholot have investigated all the principal islands of the groupe, under the several relations that we have now indicated; and the number of species that have rewarded their long excursions, much exceeds the five hundred and thirty-five which M. Von Buch had named as the sum total of the Flora of the Canaries. Our two Botanists have brought away about one thousand flowering plants, besides a large collection of *Cryptogamia;* and of this number, more than one hundred and fifty species are either entirely new, or very little known. Such results are a manifest proof of the perseverance of their researches, especially when it is considered that several excellent Botanists were in the field before them: among whom was Masson, one of the most active of collectors; Broussonet, so well known for the services he rendered to science; M. Bory de St. Vincent, whose name is his sufficient eulogium; and Christian Smith, whose untimely death all Phytologists have had reason to deplore.

MM. Webb and Bertholot have spared no labour to render this portion of their labours worthy of the science to which they are so peculiarly partial. The species which compose their collections have been determined and classed, by a reference to the best sources; in order to ascertain exactly all that had been published by their predecessors, and to decide on the validity of their discoveries. The text of the phytographic portion, already in a state of considerable forwardness, will be in Latin, on the model of Humboldt and Bonpland's fine works (*Nova Genera et Species*), and of that which M. Auguste de St. Hilaire is now publishing (*Flora Brasiliæ Meridionalis*), and the form will be

the same: more than two hundred plates will accompany this text, and present, not only line-engravings of all the new species, but also of those which have never before been figured. M. Heyland, whose style has been formed at Geneva, under the inspection of the learned Professor De Candolle, has been employed on the designs, and the details which belong to them: one of the most skilful engravers in Paris, M. Vielle, is now working upon them. This rich collection, on which the authors have lavished all their cares, will place the figures of the Canary Flora in the rank of the finest works that have ever been published in this style.

The Phytostatic department, which is to form the introduction of the Flora, is nearly complete; the Geography of Botany is there treated in detail; the general aspect of the vegetation, the distribution of plants over the soils, according to the situations and heights which they severally affect; their affinity in form and number with the Floras of other lands, are so many important questions which the authors have especially laboured to unfold. This first part will offer all the interest of novelty, and will be adorned with beautiful designs; executed from nature by M. J. Williams, and lithographed by M. de St. Aulaire, whose skilful crayon is now in eminent request for all scientific works of this kind. These plates will consist of several Phytostatic views, displaying the aspect of the vegetation at different heights. Thus a glance at this fine Atlas, will afford a general idea of the geographical distribution of vegetation in these mountainous isles; and display the several stations where they are united, by rising, in imagination, from the sea-shores to the most commanding summits. To these varied scenes will be added the "facies" of the plants; that external physiognomy which is embraced at a glance, and which is marked in broad characters. In this respect our two Botanists have the merit of opening a new path for future travellers. M. Martius, in his work on Brazil, had already showed all the advantages that may be derived from representations of the general habit in the Palm Tribes, where the great dimensions of the foliage, and the display of the floral parts, require extreme reduction in the figures, and MM. Webb and Bertholot have now done the same with the woody *Dicotyledones*. We may be allowed to hope that this happy innovation will find many imitators among botanical draughtsmen; for that loveliest of sciences will thus be rendered more attractive; and perhaps, in favour of such a picturesque department, the minutiæ of details, the dryness of diagnoses and of nomenclature, with its fatiguing list of synonyms, may yet obtain mercy in the eyes of the merely superficial observer.

BELANGER'S TRAVELS.

M. Belanger is publishing, at Paris, in one volume, 8vo., with an Atlas of sixty plates, in 4to., the botanical part of his "*Voyage aux Indes Orientales, par le Nord de l'Europe, les Provinces du Caucase, la Georgie, l'Arménie, et la Perse, pendant les années,* 1825—1829 *inclusives.*" —The announcement tells us that "M. Bêlanger, who for a period of ten years had studied Botany, paid, as might naturally be expected, particular attention to this important department of Natural Science during his travels. The value of his collections may be estimated by the variety of countries which he visited, while the report made by M. Mirbel on this subject, leaves no room for doubt. Persia, especially, which no Naturalist had so extensively explored, confers a superiority on his Herbarium there collected over those of Tournefort, Olivier, and Michaux. The gum-bearing *Astragali*, the *Umbelliferæ*, which yield *Assafœtida* and *Gum Ammoniac*, and the different species of *Cucurbitaceæ* and of *Vines*, have afforded matter for numerous observations. Nearly four thousand species are the fruit of M. Belanger's researches in India and Pegu; this rich collection, moreover, contains, among a host of curious species, many officinal plants, to the study of which our Naturalist has

ever peculiarly attached himself. In fine, the Herbarium, including the result of his researches in the Isles of Java, of Bourbon, and the Mauritius, with the Cape of Good Hope and St. Helena, contains five thousand four hundred different kinds, of which from a thousand to twelve hundred at least may be reckoned as new. To each specimen are appended the names which the plant receives in the different countries where it grows, with notes on its height, appearance, the colour of its flowers, and frequently the structure of its fruit, including those characters which are apt to disappear in the process of drying; finally, all that information which can convey a knowledge of the useful or noxious qualities of the particular vegetable, or the superstitious ideas attached to it, have been carefully collected by this Botanist.

M. Belanger reserves for himself the publication of this department, with the exception of some families, which he has confided for examination and analysis to M. Guillemin, Member of the Society of Natural History.

The new species, alone, will be described in detail, while complete enumerations, in the form of a catalogue of the different kinds gathered in each country, will convey an idea of their respective Floras, and afford materials for a general sketch of the Botanical Geography of Asia, which M. Belanger means to prefix to the second part of the scientific publication; he will also append an Essay on the officinal plants of India and Pegu.

M. Belanger's travels will be highly interesting, as communicating information upon the manners, customs, and institutions of the people who inhabit the various regions of the vast Indian Empire. Few individuals have traversed such a vast extent of country, and visited more varied and highly interesting districts; and fewer still, it must be confessed, have been placed in circumstances which admitted of their deriving so much advantage from their travels. Commissioned by Government to establish at Pondichéry a Botanic Garden, designed to be the depôt for the vegetable riches of Hindostan, M. Belanger started from Paris in 1825, accompanying the Viscount Desbassayns de Richemont, Administrator general of the French settlements in India, who was to proceed over land to his destination, and who was entrusted with a mission to the court of Persia. This expedition, which had not, so far as we are aware, been undertaken by any French traveller during several centuries, may be considered as forming an epoch in the history of the present, and becomes the more interesting, as the official situation of M. Desbassayns has placed it in M. Belanger's power to record a number of curious facts, which no other circumstances could have enabled him to collect.

Our travellers, after quitting France, crossed Germany, Poland, and the south of Russia, as far as the river Don; thence they traversed a part of Circassia and the highest chain of the Caucasus, and descended in the beginning of April, into Georgia. It is impossible even to glance here at all the fatigue and danger which they endured upon the snow; their adventures on the frozen sea of Azof are particularly striking; in short, this, the best known part of their whole route, has still afforded M. Belanger an opportunity to make so many striking and novel remarks, that this portion of the narrative will perhaps be read with the most interest of all. After a short stay at Tifliz, during which many valuable documents were compiled on the political and commercial state of Georgia, they resumed their route, on the 15th of April, and reached the Persian frontier on the 20th. From North to South they traversed all the western part of this vast country, successively visiting Erivan, Tauris, Teheran, Ispahan, and Bushir, and in each of these cities, M. Belanger noted every thing that appeared worthy of record, especially directing his attention to those points which had seemed to escape his predecessors. The topographical differences between the several provinces, the aspect, manners, customs, and situation of their respective tribes, and all the details

that could be obtained with regard to the present state of commerce, agriculture, and arts in this empire, find a place in M. Belanger's Journal. The facilities afforded by Viscount Desbassayns' mission for cultivating a knowledge of the higher population of Persia, opened to M. Belanger many channels for ascertaining their condition as to morals and education, as well as the most curious details respecting the court of Prince Abbas Mirza, and that of Teheran, with the ceremonies and customs observed in the reception of the Envoys of foreign powers; that of M. the Viscount Desbassayns being described by him with all the truth and vividness of a first impression.

M. Belanger arrived in Persia at the very time when the first discussions arose between this empire and Russia, and he has collected all the facts which could elucidate the motives for the war which afterwards broke out between these two powers. His Journal contains a faithful transcript of the local difficulties that the travellers encountered, the alarming situations in which they were frequently placed; but this darker part of the picture is relieved by numerous anecdotes relative to the Persian Ambassadors whom they met, and the private history of several individuals whom M. Belanger, in his capacity of a physician, was privileged to visit within the precincts of the harems. No less curious and valuable are the details that M. Belanger possesses respecting the character of the present Shah and his future successor, whom Europe now looks to as the only individual apparently capable of raising to its due rank among the nations the great empire of Persia.

During the whole of his stay in this country, M. Belanger bestowed much attention on its Zoology and Botany, and the collections made by him in these departments are the more valuable, as hardly any traveller has ever explored it so fully. He especially devoted himself to collecting such facts as elucidate the botanical geography of this country, based on the geological formation of its soil, and modified by its diversity of latitude and elevation: he also investigated the agricultural processes pursued in Persia, and their ingenious system of irrigation; and lastly, profiting by the reputation which he acquired from his cures of several simple diseases, he ascertained the mode of treatment commonly pursued in Persia.

Towards the end of September, 1825, M. Belanger, still accompanying Viscount Desbassayns, quitted Persia, and embarked in an Arab vessel, at Bushir, collecting much information in his passage down the Persian Gulf, on its navigation and commerce. When arrived at Bombay, he availed himself of the friendly feeling manifested by Governor Elphinstone, to obtain many valuable documents respecting this Presidency, and especially upon the Honourable Company's policy. There also he made many additions to his zoological and botanical treasures, and procured several valuable statements on the vegetation of this country, which might serve as a continuation to his *Observations on the Geography of Plants*. The Malabar coast then claimed his attention for three months, and rewarded his researches with much valuable information, especially as respects Mahé, one of our settlements in that district.

In March, 1826, crossing the Western Ghauts in their highest part, he entered Mysore, that former scene of the glories of Tippoo Saib and his father, and which, as the centre of Mussulman power in the Peninsula, still preserves some vestiges of ancient Indian independence, and is thus calculated to excite the curiosity of the intelligent traveller. It may be readily conceived that M. Belanger made diligent use of the time which he spent in Seringapatam and Benghalore, in obtaining all the information possible on the present state of this portion of Hindostan. Thence, returning by the Eastern Ghauts, our traveller reached Pondichéry, the ultimate object of this first journey. The intentions of Government in sending him thither claimed his first attention during a sojourn of nearly a year in this colony; but though the establishment of the king's garden oc-

cupied the greatest part of his time, his leisure moments were profitably spent in compiling such documents respecting Pondichéry and our other Indian settlements, as we hope will enable us finally to estimate their real importance to France.

Pondichéry being, so to speak, the metropolis of Christianity in the Peninsula, it presents the greatest advantages for ascertaining the real state, as to character and morals, of this class of the population of India; and it is likewise in this colony that we can most justly appreciate the labours of the French missionaries to effect the conversion and preserve the true faith in the hearts of the natives. Thrice, during the year 1827, M. Belanger visited the Carnatic, the coast of Coromandel, and Madras; verifying, during these excursions, his former ideas, with regard to the caste, manners, &c. of the different tribes who inhabit this presidency. Towards the close of that year he explored Lower Bengal, especially near Calcutta and Chandernagor, giving especial attention to the different public establishments in these cities.

Here M. Belanger's travels in India closed; and when we take a summary view of the result of his labours, we see him rich in large botanical and zoological collections; in observations on the vegetation and products of this vast country; in documents of the highest interest respecting the commerce and political organization of the three presidencies which compose the Company's possessions; and upon the wise and political system of administration pursued by the British towards the Indians, and the establishments founded for their benefit; upon the industry, manners, usages, and religious ceremonies of the numerous castes which make up the Indian populations of those parts which he visited; upon the situation of this Peninsula, as compared with what it was, under the sway of the Rajahs, &c. &c. and finally, our traveller possesses portfolios, filled with drawings, representing what description is inadequate to convey, and vocabularies on the languages of this country.

Pegu was next visited by M. Belanger, a country in which no Naturalist, save Dr. Wallich, who devoted himself to its Botany, had preceded him. The state of this nation and of Birmah, as to religion and general customs, especially as contrasted with Bengal, attracted his particular attention, the late war that had raged there affording many facilities for investigations in the Birmese empire.

In 1828, M. Belanger embarked for the Islands of Sunda, where he carefully explored Pulo-Merak, the island which lies next to Java; the environs of Batavia, and the district of Buitenzor. Many birds, insects, mollusca, and a fine Herbarium rewarded his researches; nor did the statistics and commerce of these settlements escape his notice, but he made such inquiries into the actual state of the Dutch possessions, and the customs of the Dutch and Javanese, as are likely to prove of high interest to these colonies. After revisiting Pondichéry, M. Belanger, on his return to France, explored the Islands of Mauritius and Bourbon, with the Cape of Good Hope, and arrived in his native land, after nearly five years of absence.

Four Fasciculi of the "*Partie Botanique*" of the work are now before us, with neatly engraved plates; but we regret to say, that the figures of the Mosses are not executed with that degree of accuracy which such subjects require, and which they deserve.

BOTANICAL EXCURSION IN THE NORTH OF ENGLAND.

By Joseph Woods, Esq., F.L.S.

My dear Sir,—It is possible that the following memoranda of a botanical tour, made this year (1835) in the North of England, may interest some of your readers; especially if any of them have the intention of following a part of the same route. If you think this will be the case, you are perfectly welcome to publish them. I have only to remark, that the plants enumerated are such as catch the attention of a Botanist from the South of England. Had I visited these counties from the North, I should

probably have passed over many which now figure in my lists, and should have added others which are less familiar to the Scottish Botanist, though frequent in the South-east of England.

The first locality I had to examine, was Leckby or Lakeby Carr. This lies about seven miles from Borough Bridge, and not much less from Thirsk. The intermediate village of Topcliffe offers the best station from which to visit it. I went in the stage from Borough Bridge to Topcliffe, and walked from the latter place, a distance of hardly two miles. A gravel-pit on the left invited me out of the road, and I passed through it to a very pleasant little bank of wood, rising from the Ure, where I observed *Ophrys Nidus Avis*, and *Paris quadrifolia*. The south-country Botanist will also be gratified by finding *Campanula latifolia*, but at this period (19th June) it was not in flower. Returning to the road, we pass by a moist meadow, which appears to have no outlet for the water. This abounds with *Carex curta*, and, in a ditch at the lowest part of the meadow, there were a few plants of *Lysimachia thysiflora*. Leckby Carr, which is not far from this, occupies a similar, but much larger hollow, without any outlet, where the drainage of the surrounding land originally formed a small pool, the memory of which seems to be preserved in the name of the neighbouring hamlet, Leckby or Lakeby, now converted into a peat moss. In a little pond near the entrance, there was a small quantity of the *Lysimachia* in flower, and it was much more plentiful in a ditch which crosses the bog, near where, at the southern extremity, it curves a little to the West. The plant is scattered pretty abundantly along the margin of the bog; but it was only in these two places that I saw it in blossom. Apparently there was not elsewhere a sufficient quantity of moisture, for, in consequence of the dryness of the season, the morass was traversable in all directions, almost without wetting one's shoes; and it was perhaps also owing to this circumstance, that I was unable to discover a single plant of the *Scheuchzeria*, though I spent an hour and a half in searching for it in a very limited space towards the southern end of the bog; the precise spot where my friend Mr. Dalton had found it on more than one occasion in the greatest abundance. *Arundo Calamagrostis* and *Drosera Anglica* are both plentiful, but I was too early for the flower. *Drosera rotundifolia* also abounds, but I saw no plant of *D. longifolia*. Mr. W. Wilson (*Hooker's British Flora, ed.* 3. *p.* 151) has established an excellent character between the latter and *D. Anglica;* but the size, colour, and tall scapes of the last-mentioned species, render it very easily distinguishable at first sight. *Vaccinium Oxycoccos* grows in great quantity, and it showed abundance of flowers and of unripe fruit. The fruit is said to be very good, as well as plentiful, in the Carr, a proof that this plant does not require springy ground, or any change of water to make it flourish. I observed a good deal of *Carex filiformis*, and *Carex curta* occurs also in this station.

I returned to Topcliffe and continued my walk to Thirsk the same evening, and the next morning proceeded to the hospitable residence of the Rev. James Dalton, at Croft. *Chrysosplenium alternifolium* is plentiful in this neighbourhood, but I was too late for it, and as much too early for the flowers of *Cladium Mariscus*, which grows at Hell Kettles. These *kettles* are two connected pools in a flat meadow, crossed by the foot-path from Croft to Darlington. They are said to have been formed suddenly by the spontaneous sinking of the ground, about the end of the fifteenth century, and to be unfathomable. A small stream issues from them; they are very cold, and emit, at times, a sulphureous smell. To get *Ribes petræum*, you must cross the bridge from Croft, and descend for about a furlong on the left bank of the Tees. There are only four or five bushes of it, and of course it was out of flower; but there was unripe fruit, which, however, it is very difficult to preserve in drying. If quite ripe, it would be impossible to preserve it, so as to retain any vestige of its

original form or structure, on which account, as well as the tendency of ripe fruit of any sort to separate itself from the stalk, the Botanist will in general do well to content himself with that which is not quite mature; but he will *not* do well, if, because Linnæus has founded his principal divisions on the flower, he should neglect the fruit altogether. *Rosa Doniana* grows at the top of a woody bank a little above Croft, on the Yorkshire side of the river; and near Halnaby, on the same side, there is a small strip of boggy ground, mostly covered with brush-wood, on the left hand of the road from Croft, which affords *Ranunculus Lingua*, and a *Carex*, which is perhaps a small variety of *C. paniculata*, but not forming dense tufts, and therefore in some degree approaching to *C. teretiuscula.* The beak also is not abrupt, as described in *C. paniculata*, but tapers gradually from the fruit. Hooker (*Brit. Fl. ed.* 3. *p.* 395) mentions a continental species, *C. paradoxa,* which is intermediate between these two. That species, however, is described as forming very large and dense tufts, (see *Gaudin. Fl. Helv.* 6. 43) and therefore can have nothing to do with this plant. Some difficulty has arisen from the figure of *C. teretiuscula* in English Botany, where the scales are altogether brown, whereas, according to Gaudin, *l. c.* the scales of *C. teretiuscula* in a young state have uniformly a whitish border. In my plant they have a pretty wide scariose margin. I gathered in the same place an *Eriophorum*, somewhat resembling *E. pubescens*, and having, like that, a short, close down on the spike-stalk. It is remarkable for its very slender, almost capillary leaves, and the naked upper part of the culm. The seeds are linear, not, as in *E. pubescens*, obovate. They are slightly attenuate at the base, and of a very pale colour. This appears to me to be the *E. gracile* of Roth and of Gaudin; and, judging from the description, I should say also of Smith; but the only British specimen in the Herbarium of the latter, though too young for absolute decision, appears to be different. It is probably the same as that to which the name has been applied of late by British Botanists, a plant with smooth spike-stalks and elliptic seeds, at least such has been the case, so far as I have had the opportunity of examining them, and in these particulars and in the general appearance of the plant, it is more nearly allied to *E. angustifolium* than to *E. pubescens.* The Herbarium of Sir J. E. Smith contains two other specimens, with the name of *E. gracile:* one from Schrader, marked in the writing of that Botanist "*E. triquetrum*, Hoppe, Germany." In this, if carefully examined, the spike-stalks are found to be pubescent, the seeds are pale and linear-oblong rather than linear. The other is a Lapland specimen from Wahlenberg; a stouter plant, more leafy at the base, and with an obviously pubescent spike-stalk. Another Lapland specimen, in the possession of Mr. Borrer, gives the idea of a slender plant, with a nearly naked, lengthened culm. It has pubescent spike-stalks, and oblong seeds, much like those of Schrader's specimen. In my younger days I had always considered as *E. polystachyon* the plant which I am now instructed to call *E. pubescens*, and I have still no conception of what is meant by *E. polystachyon* in the English Flora, which I think is not that of any other work, and which seems distinguished by no marked character from *E. angustifolium.* If indeed we are to understand by the expression "leaves flat," that they are not any where channelled, it is a circumstance I have never met with in any species of *Eriophorum*, and may possibly be a good distinction. My plant grew within the water of a little pool, and in the same neighbourhood was a considerable quantity of *Pyrola rotundifolia*, but hardly yet in flower.

On the 23rd June I went to Durham, to meet Mr. J. Jansen, and we proceeded on the 24th to Sunderland, where, in spite of the continued rain, we rambled over the ballast-hills, but without finding any thing. A considerable portion of these is now covered by cottages. Ballast-hills plants which succeed in establishing themselves, as *Lepidium Draba* at Swansea, and *Trifolium stel-*

latum at Shoreham, are interesting from that circumstance; for the causes which render some plants of easy naturalization, while others, apparently equally well suited to the climate, and with as abundant means of propagation, invariably die off, are still very obscure: but a chance plant or two, of which the seeds have been accidentally brought over, and which neither spread by their roots nor ripen their seeds, are of little consequence. On the next morning we went to Castle Eden, and the weather at last began to improve, though still cloudy and so cold that we found fires lighted for us as a matter of course in the bed-rooms. The Dean or Dene, for I know not which way it should be spelt, is a romantic narrow valley, frequently bordered with rocks and almost every where covered with woods. There is a road through the greater part of it, quite down to the sea-shore; but the lower part exhibits, for the most part, steep gravelly banks instead of the perpendicular limestone rocks which diversify and adorn the upper. I had been directed to seek for the *Cypripedium Calceolus* on the top of a steep rocky bank, opposite to an insulated rock, on each side of which the road passed, but we could find no such rock, and our search for the *Cypripedium* was in vain. The plant suffers from the unceasing rapacity of gardeners. Yet it does not bear a high price, and I suppose from this circumstance it is propagated without much difficulty; but, at least in the gardens about London, it rarely flowers. I believe that in some places in the North of England, it is not only increased without difficulty, but also blooms freely. The Dene offered to us *Geranium sylvaticum, Melica nutans, Rubus saxatilis, Geum rivale, Trollius Europæus, Vicia sylvatica*, and other plants of the North of England. *Festuca rubra* grows in the sand on the sea-shore. *Pyrola rotundifolia* is also abundant, chiefly in the northern branch. *Carex fulva* inhabits springy ground towards the sea-shore. This species, with *C. distans, C. binervis*, and *C. lævigata*, form a groupe, of which it is not very easy to catch the specific characters, and perhaps we may add to these *C. speirostachya* and *phæostachya* of the *English Flora*. The want of an awn to the scales of the fertile catkins is pointed out by Sir J. E. Smith as an important difference between *C. fulva* and *C. distans; C. binervis, C. lævigata*, and *C. phæostachya* have also pointed scales, but *C. speirostachya* is in that respect like *C. fulva*. The nearly smooth leaves, smooth fruit, and the membranous edges of the orifice of the beak in the first mentioned species, seem to form the only differences. My plant has the leaves smooth at the base, but rough with fine prickle-like serratures in the upper part on the keel and on the margin, especially on their strictly triangular ends. The fruit is smooth, except on the beak, whose edges are between rough and pubescent. The membrane of the orifice of the beak is very striking, on these specimens from C. Eden Dean; but it seems to be always present, though not always equally conspicuous, in *C. fulva*. I gathered here also a variety of *C. sylvatica* with compound spikes. There are some other little woody hollows, apparently similar to this of Castle Eden, but on a smaller scale, between the road and the shore. We had no time to visit any of them.

From Castle Eden we went to Helmesly. Crossing on foot the range of the Black Hambledon Hills into Bilsdale, at a part marked on Crutchley's large map of England, *Carleton Bank*, an irregular wood above Stokesley, partly opening into a common, and with a good deal of springy ground, invited our researches, but did not reward them; nor were we more successful on some crags of a coarse sandstone near the summit. Keeping to the west of the road, we had the pleasure of finding among the young plantations near the top of the hill, the *Trientalis Europæa* scattered among the heath and fern in tolerable abundance, and just in flower. At Helmesly we heard again of *Cypripedium Calceolus*, and a gardener, who confessed that he had taken up all the roots he could see, conducted us to the spot where it used to grow, which is a limestone bank near the

head of the western branch of the little valley which penetrates the hills just behind Helmesly. *Helleborus viridis* is found abundantly about this spot, and we observed *Ophrys muscifera* and *Epipactis latifolia*, but no trace of the *Cypripedium*, except the hole from which the last specimen was dug on the 15th of May, 1834, at which time the flowers were not expanded. The said gardener had first seen it on the 19th of May, 1828, when it was in full bloom, and had taken up five roots. We threatened him with an act of parliament, made expressly to hang him, but he did not appear so much alarmed as we could have wished. This little glen unites with another, watered by a little stream called the Dark Gill, which is said to abound in Ferns, and this is certainly the fact, but they are only the common sorts, and no trace of *Onoclea sensibilis*, of which one tuft is said to have been found somewhere on the moors near Helmesly. We observed *Polypodium Dryopteris*, and a large variety of *Aspidium Felix fœmina*, and I think nothing else worth notice; lower down, after the union of the streams, we noticed *Primula farinosa*, *Eriophorum pubescens*, and *Epipactis palustris*. There are numerous glens about Helmesly, some entering the hills on the North of the broad and beautiful valley in which the town is situated. Others on the South, in what our informant assured us was a soil of quite a different nature: all rough and woody, and in appearance tempting to the Botanist, but we were not able to examine them. *Ophrys muscifera* grows in several places; *O. apifera* on the magnificent terrace above Rivaulx Abbey, where the plants are carefully preserved; *Serapias ensifolia* in the woods in the same neighbourhood, and also *Ribes alpinum*, and *Blysmus compressus* in a springy piece of ground near Rivaulx Abbey, and in other places. Passing from Helmesly to Thirsk, we took Gormire Pool in the way, which, like Leckby Carr, occupies a hollow without an outlet. Here we were much gratified in meeting with *Lysimachia thyrsiflora* in considerable abundance, and with a *Potamogeton*, which I believe to be *P. lanceolatum*, but without any floating leaves. According to the observations of Mr. Wilson, as recorded in the *British Flora*, this ought not to take place in stagnant water, but I believe that in an early stage both this and *P. heterophyllum* are frequently without floating leaves, in whatever situation they are found. *Potamogeton* is one of those genera where the desire of Botanists to clear up the obscurities of plants, which had previously claimed little attention, has induced them to multiply the species beyond what nature sanctions.

My companion left me at Thirsk, and I again (29th June) hunted in Leckby Carr for the *Scheuchzeria*, without any better success than on the former occasion. *Arundo Calamagrostis* had made some progress, but was not yet in flower. *Drosera Anglica* remained nearly in the same state. *Vaccinium Oxycoccos* no longer presented such a multitude of blossoms. I extended my walk to Thornton Bridge, where I found *Rumex aquaticus* of *British Flora*. The plants here had a broad bushy panicle, something like that of *R. alpinus*, which attracted my attention; but afterwards, at Barnard Castle and other parts of Teesdale, I gathered what is seemingly the same plant, with the panicle much more like its common appearance in *Rumex crispus*, and differing from this in little but the want of any bead upon the valves. *R. crispus* itself seems to vary much in this respect. On the sea-shore I usually find it with distinct and nearly equal beads on each valve on a large portion of the flowers (not on all), while in its more common appearance, as observed in the *British Flora*, it is usual to find a fully-formed bead only on one valve.

After again experiencing the hospitality of my excellent friend Mr. Dalton, I proceeded to Barnard Castle, and on the 2nd of July walked down the valley of the Tees to considerably below Egglestone Abbey. The river runs nearly in a straight channel between limestone rocks, on which *Galium boreale* grows very abundantly, as does also *Salix tenuifolia*, or perhaps ra-

ther *S. Weigeliana,* if the species be indeed different. *Hieracium murorum, Myrrhis odorata, Elymus Europæus,* and *Carex sylvatica,* with compound spikes, occur in this spot. *Potentilla rupestris* is also said to grow here, but I searched for it in vain. I proceeded to Greta Bridge, and walked thence up the very wild and romantic glen of the Greta. *Epilobium angustifolium, Cnicus heterophyllus,* and *Asplenium viride,* were the only plants which occurred to me as at all rare. On the 3rd I walked up Deepdale, where the scenery is very pleasant, but less bold and romantic than that on the Greta; and I here found the same plants, with the addition of *Habenaria viridis.* After getting into the moors, I descended towards Cotherstone, gathering *Sedum villosum* in plenty a little above West Briscoe; and afterwards ascended for five or six miles the valley of the Baulder, to find the place where this brook is joined by another, called the Black Beek. I thought I had reached the spot, but afterwards had reason to believe myself mistaken: I certainly did not find the *Saxifraga Hirculus,* which was the object of this walk.

I slept at a comfortable little public house at Cotherstone, a very pleasant place, and with high bold woody banks on the opposite side of the Tees, which, however, I did not visit, but had a very pleasant ramble on the Yorkshire side to Egglestone bridge, and thence to Middleton, finding for the greater part of the way a footpath through the meadows, one of the delightful circumstances of an English walk. I have not mentioned in these latter walks, *Scirpus pauciflorus, Blysmus compressus, Carex dioica,* or *Primula farinosa,* all of which are common in springy ground throughout this part of the country. *Ribes petræum* I observed not far from Egglestone bridge, and *Salix tenuifolia,* or what I suppose to be such, continues frequent on the banks of the river.

I found a young man at Middleton (G. Pinckney, jun.) who knows something of Botany, and we walked together through the meadows on the banks of the Tees, as far as Winch Bridge. The *Sanguisorba officinalis* is plentiful here, as it is indeed throughout the North of England. *Polygonum viviparum* is exceedingly abundant, while *Bistorta* (here much the rarer plant) only occurs near Winch Bridge. I gathered also on the banks of the river, near Middleton, *Thalictrum majus, Melampyrum sylvaticum, Hieracium cerinthoides* (only one plant), and one or two plants of *Bartsia alpina.* On the basaltic rocks, at Winch Bridge, we got also *Potentilla alpestris, Festuca vivipara,* and *Habenaria albida. Potentilla fruticosa* is also very plentiful among these rocks, and the profusion of its bright yellow flowers added greatly to the charms of the scene. How far the *Potentilla alpestris* is distinct from *P. verna,* I will not attempt to decide; but the appearance is different, and its mode of growth much more loose and straggling. Under *Festuca vivipara* I think we usually include varieties both of *F. ovina* and of *F. duriuscula;* but the plant at Winch Bridge is exclusively the *F. ovina.* Winch Bridge is a suspended foot-bridge of iron, which shakes under the tread. The old bridge was of wood, and very picturesque, but so ill supported that it tipt on one side as a person was going over it, not very long ago, and this accident seems to have determined the erection of the present structure.

Pinckney's occupations would not permit him to act as guide to the *Saxifraga Hirculus,* so after getting from him the best account I could of its exact position, I set off alone to look after it. He described it as a black shaking bog, a little South of the Baulder, and not far from a hill called Shackleborough. I found, in such a situation, and about half or three quarters of a mile from the place where the Black Beek joins the Baulder, a boggy piece of ground, shaking in parts, but whether this was the spot meant I do not know, as I could detect no trace of the *S. Hirculus.* If any decent public house could be found between Bowes and Brough, it would probably be a better station from which to hunt for this scarce plant than Middleton

or Cotherstone, as its habitat cannot be far from the dividing ridge of the forest of Stanmoor, which separates the waters of the Eden from those which fall into the Tees. On the 7th I walked up Hudcope-head in the rain, to search for the *Listera cordata,* which I did not find. *Ribus Chamæmorus* was in great quantity, but quite out of flower, and showing very little appearance of fruit. Yet the fruit is said to be gathered by the children, and brought down to Middleton for sale in considerable quantity. In the evening I went to High Force, a waterfall of the River Tees, near which there is a little inn; the new high road to Glasgow is expected to pass this way. It rained heavily, and was very cold and windy, and continued so all night. In the morning the scanty stream which, only the evening before, left, at the fall, the greater part of its bed uncovered, was changed into a magnificent and foaming torrent, which I could contemplate as I lay in my bed.

It held up a little in the morning, and I continued my walk. I had been told at Middleton that I should find it not difficult to 'step t' Tees' at almost any point, but after the rain of last night not only the Tees, but many of the brooks which run into it were impassable. This added considerably to the length of my walk. Widdy bank is a broken earthy bank of the Tees, enriched with *Kobresia caricina, Carex dioica, C. capillaris, Tofieldia palustris, Habenaria albida, Habenaria viridis, Gentiana verna, Bartsia alpina,* and *Equisetum variegatum,* a noble harvest for a space not a quarter of a mile long or a hundred yards wide. On Falcon Clint, and Whinstone Crag, higher up the river, I observed *Asplenium viride, Hieracium maculatum?* and *Saxifraga hypnoides.* The *Saxifraga cæspitosa* has been stated to grow here, but it is, I think, generally acknowledged to be an error. *Osmunda Lunaria* I gathered near Caldron Snout, another cascade on the Tees, and in such weather as this a very fine one. The water does not fall at once over a perpendicular precipice, as at the High Force, but rushes among broken rocks down a steep descent. I here crossed the river, and afterwards the Maize Beek, which joins it just below Caldron Snout, in order to ascend Cronkley Fell, where I found *Cistus marifolius* or *canus* (for I confess myself unable to distinguish them), *Hippocrepis comosa, Arenaria verna,* and *Dryas octopetala;* but the cold and wet were great discouragements to my botanical exertions. Eighteen sheep which we saw dead, or dying, on the mountain, attested the severity of the weather during the last twenty-four hours.

I slept at Birkdale. The hamlet consists of only two or three cottages, and there is no public house: but I was hospitably received, and made very comfortable at a farm-house, where they have a room principally for the reception of the sportsmen who frequent these desolate moorlands. Micklefell, on the Yorkshire side of the Maize Beek, which here divides the counties, seemed to me much more lofty than Cronkley Fell, and, if the guides at the Cumberland lakes do not make a mistake, it forms a very distinguishable object from their mountains. On the 9th there seemed to be no hope of better weather, I therefore walked to Appleby. About half way between Birkdale and Dufson I passed over some craggy ground, with bold rocks rising above me, and apparently a considerable precipice beneath, where I observed several of the plants of the preceding day, such as *Saxifraga hypnoides* and *Arenaria verna,* and which I could be well content to visit in better weather, but the soaking rain and thick mist rendered it almost impossible to understand my position, or to examine its Botany. *Rubus Chamæmorus* I observed in several places. These moors, comprising the forests of Stainmoor, Lune, and Milbourn, and a great extent of country North from Cross Fell to Aldstone Moor, form probably the most extensive and desolate tract of heath and bog to be found in South Britain. At Appleby I found an excellent inn, which was a great comfort, wet and tired as I was, and the next morning walked to Penrith. No plant at all rare occurred in the way, and not even any

vegetable peculiar to the North, unless, perhaps, we may so account the *Sycamore*. The soil is every where a red sandstone. Here and there the scenery is beautiful, especially on the banks of the Emont, where the ruins of Brougham Castle afford a picturesque object; and from most points of the road, the distant mountains of the Lakes form a noble boundary. Of these Saddleback stands conspicuous, both by its apparent size, its detached position, and the boldness and irregularity of its form.

Some apparent improvement in the weather induced me, on the 11th, to make a second approach to Cross Fell (I had intended to walk there from Birkdale), but the evening was again wet and dismal, and the 12th was no better. Mr. Salkeld's pastures, mentioned in the Botanist's Guide as the station of several rare plants, are at a farm called Ranbeck, which is situated to the East, and not to the North of Kirkland, as marked in Crutchley's large map of England. A limestone hill, to the North of Kirkland, gave me *Osmunda Lunaria*, *Ophioglossum vulgatum*, *Habenaria viridis*, *Cistus Helianthemum*, and *Anthyllis vulneraria*. *Rosa villosa*, in the form of *R. mollis* of *English Botany*, occurs occasionally, but the *variety* where the calyx divisions are not quite entire, is much more common, and I confess myself unable to draw any line between this and *R. scabriuscula*, or between *scabriuscula* and *tomentosa*. The short straight stems of *R. villosa* gradually pass, through the intermediate state of *R. scabriuscula*, into the long and gracefully bending shoots of *R. tomentosa*, and a similar gradation takes place in the straightness of the prickles, and in the simpleness of the segments of the calyx. *Veronica spicata* and *montana*, *Scirpus sylvaticus*, *Agrostis spica-venti*, *Sesleria cærulea*, *Arundo Calamagrostis*, *Gentiana campestris*, *Andromeda polifolia*, *Potentilla verna*, *Trollius Europæus*, *Thlaspi alpestre*, *Arabis stricta*, *Erodium moschatum*, *Geranium phæum*, *G. Pyrenaicum*, *Orobus sylvaticus*, *Orchis ustulata*, *Listera cordata*, are all mentioned as growing in this neighbourhood; but I saw none of them; partly, no doubt, because I was too late in the season, partly because I did not visit the precise situations in which they are found, and because the thick mist and heavy rain damped my exertions, and prevented me from observing the best places: but some are probably inserted by mistake. *Arabis hirsuta* grows here and there in several spots, and we have examples elsewhere that this has been mistaken for *Arabis stricta*. *G. Pyrenaicum* is a plant which occurs in several places, in the neighbourhood of towns, especially in a light but fertile soil, and it seems to be increasing, but I doubt if it be any where an original plant of the country. *Myosotis cæspitosa* is the common Scorpion Grass of the springy ground in this part. *Sedum villosum* I observed about Blencarn, and *Pteris crispa* (the first time I met with it in this excursion) on the grit rocks of some of the lower offsets of Cross Fell.

On the 13th, the wet still continuing, I returned to Penrith, without having accomplished my object in the ascent of Cross Fell, and on the 14th, on a dull and threatening, but not absolutely wet day, proceeded to Keswick. Mr. Wright conducted me to a station where we found *Pyrola media* and *secunda* at the upper part of the woods, but below the precipitous part of Wallow Crag. On the 15th the morning was wet, but I afterwards went with the same guide to look after some plants of the neighbourhood, viz. *Athamanta Meum*, which we did not find; but of which I have a specimen gathered by Mr. Otley, in the meadows behind the vicarage. A *Campanula*, not yet in flower, but which appears to be *C. rapunculoides*, a *Rosa*, imagined to be *cinnamonea*, but which is, I think, *R. Pennsylvanica*, of which there are two or three bushes in a hedge dividing two meadows in the flat ground on the borders of the Derwent, a *Lysimachia*, supposed to be *L. punctata*, but which is certainly only *L. vulgaris*,[1] and *Rosa gracilis*, which is still found

[1] The Rev. Mr. Dalton writes to me that *L. punctata* has been again found in the neighbourhood of Darlington, in a new station, and not where Robson once found a single plant.

about four miles and a half from Keswick, on the road to Lorton, where I first observed it, thirty-five years ago. It exists only in one spot, and according to Mr. Wright, is not to be found any where else in the neighbourhood.

On the 16th I ascended Helvellyn by Fisher Place Gill. This little stream descends in the lower part of its course through a very confined rocky ravine, ornamented here and there with a few bushes, and forming several pretty cascades. Here is found *Pyrola secunda,* which is lost in Ashness Gill, the place to which Hutton used to conduct the Botanists who applied to him. Above this confined part of the stream, we found *Listera cordata* and *Juncus triglumis*, and a *Pinguicula,* which is perhaps *grandiflora.* The flower is very much larger than in the common appearance of *P. vulgaris,* and the border is abundantly veiny, but the corolla is not "nearly regular," as described by Sir J. E. Smith, nor are the lateral lobes truncated, or the lower one notched, as pointed out by Dr. Hooker, though the lower division does appear somewhat retuse. Many of my Yorkshire specimens, which have no pretensions to be called *P. grandiflora,* have the corolla veined, and the leaves are more or less veined in all of them. In the fresh plant the veins of the corolla are wide and indistinct; in drying they shrink and become more definite. From the top of Helvellyn we descended to Striden Edge, where we found *Cerastium alpinum, Rhodiola rosea,* in perfection, *Saxifraga hypnoides,* var. *platypetala, Oxyria reniformis,* and other mountain plants, but I added nothing to what I had gathered there on a former occasion, unless, perhaps, a species of *Hieracium,* not quite in flower, which I have not yet been able to determine.

The 17th was very wet, and I went to Whitehaven, thinking I might have better weather, when a little away from the mountains. The following morning, however, was still rainy, and I scrambled on the sea banks towards St. Bees'head, among the high grass and bushes, loaded with water. I found nothing but *Vicia sylvatica, Asplenium marinum,* and *Habenaria viridis.*

On the 20th, after a wet night, the weather cleared up, and I went in the Carlisle stage to Flimsby, where I found *Sisymbrium Monense* (*Brassica,* Br. Fl.). Mr. Otley has since told me that he got *Lithospermum maritimum* in the same neighbourhood, on the outside of a little patch of cultivated land, between the road and the sea, almost the only part of the coast which I did not examine. My chief object in this excursion was to seek for *Geranium striatum,* of which Mr. Wright had shown me specimens, gathered on the sandy ground near the sea, where he had found it mixed with *G. sanguineum.* Mr. Wright had accompanied me part of the way to Whitehaven, and then left me to visit a daughter who was unwell, in the neighbourhood of Ennerdale. Being nearer to the mountains, the weather had been heavier with him than at Whitehaven, and I did not see him again till the evening of the 18th, after which he returned to his daughter, leaving his box with me. He was to have met the stage on the 20th, and to accompany me to Flimsby, and I brought his box with me to Workington, and there left it, since he did not arrive in time. I met him in returning from Flimsby towards Workington, and we proceeded to hunt for the plant, according to the memorandum he made when he first met with it, viz.—"Opposite the first gate after the road has turned from the valley of the Derwent to follow the coast towards Maryport." I mention all these circumstances, because as the plant has not hitherto been admitted into the British Flora, and the station is such as hardly to permit the possibility of its being an accidental escape from a garden, some persons might, from what follows, imagine that Wright had brought it to the spot, and I wish to show how extremely difficult, if not impossible, it would have been for him to do so, even if he were a man capable of attempting such a deception, which I am persuaded that he is not. After some time spent in the search, he called me, and I saw him standing with

a plant of the species in question in his hand. It had been growing on the edge of a rabbit-hole, and had been undermined by those creatures, so that when he placed his foot upon the plant, which he did without seeing it, the ground had given way, and it had become detached from the earth, or rather sand, in which it grew. The specimen was somewhat faded, but not more than some of the *Geranium sanguineum* in the neighbourhood under similar circumstances, and very far from what it must have been, had it lain four days in an almost empty vasculum, or had been brought without a box for a distance of eight or ten miles that morning. We saw no more of it, either in this station or in another at a little distance, which Wright had also noted. The shore south of Workington gave us nothing.

On the 21st we set off by seven, in a miserable "conveyance," to Ravenglass, where we found nothing but *Centunculus minimus*, and a minute variety of *Erythræa latifolia*, hunting in vain for *Sisymbrium Monense* and *Lithospermum maritimum*, both of which, I think, I had found in that neighbourhood on a former occasion. The next day we walked over Muncaster Fell, which is of granite, crossed the Mite by a deserted farm-house, and visited Wastdale Screes. My active and energetic companion descended one of the ravines quite to the shores of Wastwater. I went about half way, and then finding the descent become more and more difficult, I re-ascended, but not in the same line, and in so doing got into a narrow cleft of the rock with a stream running down it, which I should have thought a most excellent position for alpine plants, but I found nothing there but *Saxifraga stellaris* and *S. aizoides*, *Oxyria reniformis* and other species, peculiar indeed to our mountains, but on them very commonly met with; *Saxifraga oppositifolia* grows in several places, but of course it was out of flower, and *S. hypnoides* and *Asplenium viride*. The next day we went up Haller Gill, hoping to find something on the decomposing granite into which it penetrates. We then again visited the Screes, and my enterprising companion again descended, while I contented myself with going down from the summit in several places for a short distance, for nearly their whole length. I had gathered, some years before, the *Potentilla fruticosa* in such a position, but I could this time see nothing of it. There is a piece of boggy ground between the two summits of the Screes; and where a little stream draws from this, we have an easy descent among the rocks for a short distance, and this spot, I think, unites all the species that either Mr. Wright or myself observed on the mountain. *Asplenium septentrionale*, said to grow here, we could not detect, but the bank is so continually giving way, that its present condition hardly gives us any power of tracing the past, or indicating future habitats. Mr. Wright found the remains of an iron-work on the descent, which he attributes to the Romans. It was marked by something of an artificial platform, which had lasted through all the changes of the mountain, by a quantity of *Scoriæ*, and by a vein of beautiful mammillated iron ore in the neighbourhood. It is to be noted that these falls of the mountain, which are now so frequent, only began in the early part of the last century. A few years ago, the movement was so considerable, that for some days the mountain seemed to be on fire from the smoke or dust ascending from it, and the outlet from the lake being stopped up, the meadows above it were overflowed, till a channel was dug for the discharge of the water.

On the 24th we ascended Seafell Pikes, the highest mountain in England, 3,166 feet above the sea. It consists of greenstone, which seems to split readily into fragments, but not to decompose into a good soil, so that the upper part of the mountain is covered with loose stones, and neither these nor the crags a little lower down, nourish any rare plants. Indeed there is little vegetation of any sort. From this excursion I returned to Keswick, and

botanized in its neighbourhood without much success. *Juncus filiformis* is not now to be found at the landing-place, but is abundant a little more to the right, on some flat marshy ground, and on the shores of a neighbouring peninsula. I ascended Saddle Back; and a ridge, called the Sharp Edge, with almost perpendicular crags facing the North, moist and abounding in vegetation, seemed to promise a tolerable harvest, but though I ascended the edge, entering from time to time among the rocks on the northern face, and Mr. Wright scaled the crags, we found nothing. Hardly any, even of the common mountain plants, grow there; and if any one should write an account of the Botany of Saddle Back, it must be, not of the plants which it possesses, but of those in which it is remarkably deficient. On the 28th I went to Wythburn, where there is a very comfortable public house, gathering *Imperatoria Ostruthium* by the way, and on the 29th again ascended Helvellyn, but not to the highest point. I descended and again ascended the projecting part of the mountain, which is, I believe, called Sunday Crags, observing there most of the plants which I had met with before on these mountains, and lower down, in descending towards Grisedale, I added to my list *Thalictrum alpinum* and *Silene acaulis* in some very rough ground. I slept at Patterdale, and walked the next day to Penrith.

From this account, it would appear, that the mountains about the lakes of Cumberland and Westmoreland, offer by no means a rich harvest to the Botanist, but it is well sometimes to know what places are unproductive, in order not to lose time in re-examining what has been already examined in vain. The points to which I would chiefly direct the attention of the future tourist, are some micaceous rocks on the North side of Skiddaw, at about half the ascent. These, so far as I know, have never been well explored, and they are said to be the only micaceous rocks in the district, and as a micaceous soil is among the best for Botany, it is very probable that they may contain some rare plants. Next to these, in point of interest, is the district about Helvellyn and to the South and South-east of that mountain, lying between the roads from Wythburn to Ambleside, and from Ambleside to Patterdale. The small part that I visited of this tract was certainly the richest of any which I encountered among the lakes this year, and my memory of what I found on a former visit, to the left of the last-mentioned road, confirms me in this opinion. Perhaps the mountains above Coniston might be visited with advantage, and also those to the right of the road, over Kirkstone from Ambleside to Patterdale. *Epilobium alsinifolium* is abundant about the head of Kentmer and of Long Heddale. *Salix herbacea* and some other plants are said to grow with uncommon luxuriance on Red Pike; while Dale Head, above Crummock Water, is the station assigned by Hudson for the *Hieracium Auricula*, a plant which seems not to have been found in Britain by any body else. The station is not quite correctly given in the books, as Dale Head is near a mountain called Grasmer or Grasmoor, and not near the lake called Grasmere. One of my objects in examining so carefully Wastdale Screes, was to find the *Epimedium alpinum*, recently said to have been discovered there, among brambles. There are no brambles on the upper part of the mountain, and therefore if the *Epimedium* grow there at all, it must be in all probability, at the foot of the rocks, and at the head of the sloping shivery bank which descends from them into the lake; a part very difficult of access, on account of the loose and yielding materials of which that bank is composed. Mr. Wright finds *Epimedium alpinum* in deep boggy woods at Brayton. At Mugdock (in Scotland) it has established itself on the wall of the old garden of the castle. It seems hardly probable that so scarce a plant should be so little nice in the choice of its position. I know not its exact situation in the countries where it is more plentiful. It does not occur in the Flora of Switzerland;

Duby says, "*in umbrosis et dumetis montanis Alpium et Vogesorum.*" In Germany it is only mentioned as growing in Carniola. Pollini speaks of it as not rare in the Tyrol and the North of Italy, "*in sylvis et dumetis collinis,*" and the *hills* of this district are not generally boggy. If an English plant at all, I should rather have expected to see it on the warm hills of the South, than in the wet and cold of the North.

From Penrith I again went to Blencarn, and this time succeeded in ascending Cross Fell. The highest brow of the mountain is a bank of loose grit stones. The summit is cushioned with *Trichostomum lanuginosum; Nardus stricta, Festuca ovina,* and *Agrostis vulgaris,* are the Grasses which chiefly grow between the cushions. The highest and most plentiful springs are towards the East and South-east, where the view stretches over the upper part of Teesdale, a dreary region; indeed, from this eminence, on three sides of us, we see nothing but a dismal prospect of moor and bog. I found *Epilobium alsinifolium,* but in small quantity, and a few other plants, such as *Rhodiola rosea, Draba incana,* a *Hieracium* —— ?, *Galium pusillum, Cystea fragilis,* and *Asplenium viride,* all on some limestone rocks at the head of the little Gill which separates Cross Fell from Dun Fell, and Cumberland from Westmoreland. I would recommend any Botanist wishing to ascend the mountain to take this gill as his guide. I returned by Culgaith. The moor, mentioned as the station of two or three plants in the Botanist's Guide, is a nearly level tract of barren soil, which has been inclosed, but for the most part not cultivated.

I must here end my journal, for the slight view I allowed myself of Scottish Botany will have no interest, because it decides nothing, and I believe the only new habitat I observed of plants already known, is the station of the *Saxifraga cæspitosa* of English Botanists, among the rocks near the summit of Ben Nevis.

SOME ACCOUNT OF THE VOLCANO AND VALLEY OF ANTUCO, IN THE PERUVIAN ANDES.

Translated from Dr. Poeppig's Travels.

The valley of Antuco, containing the highest inhabited place of the Southern Andes, extends from East to West, and is about seven German miles long, of inconsiderable breadth throughout, and divided into two nearly equal parts by the River Laxa. At its lower extremity, a low chain of mountains separates it from the Plains of Yumbel and Los Angelos, at the East it suddenly rises and becomes narrow, and in this direction is almost perfectly closed by the broad foot of the Volcano, so that between it and the line of mountains opposite, there is only space for the rapid river and a narrow pass, through which access is obtained into the Indian Country. The ground, in many places, would not repay the trouble of cultivating it, as it resembles the dry bed of a river, and is covered with volcanic stones; but the sides of the mountain and the plain that stretches at the foot of them, maintain their character for great fertility. Sometimes these terrace-like platforms rise one above another, as natural meadows in the midst of mountain woods, their luxuriant vegetation attesting the depth of the soil. Every where, brooks run down from the mountains, of which the lovely green peaks are over-topped by still loftier summits, covered with eternal snow. The mountains are so high, even in the immediate vicinity of the village, that the bold brow of the Pico de Pilque is only attainable by several hours' ascent, while further up the valley they rise to even more gigantic elevations, till at last, the indented Gletschen, the Silla Velludo, and the black cone of the volcano of Antuco, close this extraordinary *coup d'œil.* The situation of the village itself is most picturesque, being perched on a lofty ascent, whose top is ornamented with beautiful Beech woods.

In a clear summer morning, the Naturalist, unaided by any kind of road, explores these elevated situations with the

keenest delight, and when fatigued with collecting the immense variety of alpine plants that abound here, he may recline under the shade of enormous trees, and refresh himself with the contemplation of the splendid prospect of the snowy Andes. The invigorating pureness of the atmosphere gives a keen zest to his enjoyment, and takes away the feeling of weariness. But still the most noble and ever-varying object in the landscape is the Volcaño, which, but a few hours distant from the village, rises almost every where open to the view, clear of the neighbouring mountains. The eye can never be tired of watching the various appearances that it presents, as these are diversified by the light that breaks upon it in different directions, and as the external phenomena betray the violent action that takes place within.

Sometimes a volume of the blackest smoke darts upwards from its crater, from which the ignited masses are propelled as by the force of a cannon, and with the greatest rapidity, into the calm blue sky: at other times this mass curls quietly up, the calm white clouds resting on the mouth of the volcano, and attesting its internal repose. The aspect of this mountain is ever new, but at no time perhaps so interesting as when the sun rises behind it, gilding its regular outline, or when the evening beams yet linger on its summit, long after they have quitted the valley of Antuco. Even when storms sweep round its foot, and the atmosphere remains calm on the low ground, the view is still interesting and glorious. As though it had victoriously struggled against the envious barrier, its top bursts through the clouds, and while they form a dense fearful vapoury circle around it, the cone appears distinctly outlined on the deep blue background, its every indentation defined with the most perfect clearness. At night, the fiery glow that constantly hovers above the mouth, reveals it through a sky heavy with snow and hail. The middle of summer, indeed, dissolves the snowy mantle that winter had left, and black and solemn, it closes the back-ground of the pleasing green alpine landscape; but the passing storm that does not so much as extend to the valley, robes the volcano, even during the warm month of January, with a white garment, enabling the votary of nature to observe the peculiar phenomena which internal heat produces on this elevated mountain. Late in the evening, when the last moment of day-light has faded, the glowing lava stream becomes gradually visible; at first a single red point appears to kindle, followed speedily by another and another, till a running fire is seen in long stripes, branched or undivided, and stretching from the crater, conveying continually fresh streams of lava to its foot, and illuminating the country for full twenty miles around, till the more powerful influence of the sun's light seems gradually to quench this brilliant exhibition, and restores the mountain to blackness and to gloom. —At seasons when the air is free from vapour, as in November and December, a truly magnificent spectacle may be occasionally beheld. If a slight storm has sprinkled the volcano with pure fresh snow, and the full moon has risen, a fourfold light may be seen playing on the crater, in the most singular manner. Whilst the moon defines its outline accurately, and the last lingering sun-beams light up the surface, the tranquil lustre of the glow that rises above the mouth, unites with the glowing lava to light up the dark western side. And if, at the same time, some light fleecy clouds should skim over the top, such a scene presents itself as no words can describe, nor could the pencil of the most experienced and daring artist portray, for whatever of grand and beautiful can be produced by the light of the moon, the reflection of the snow, the volcanic blaze, and the evening sun, are here united in one sublime whole.

Our excursion over hill and dale, in this unknown country of Alps, commenced on the third day. Six horses were gradually purchased of these wine-loving Indians, and the keep of them costs nothing at Antuco, where meadows of perpetual ver-

dure cover the hills. Our expeditions led to such considerable distances, and were accomplished, for the sake of saving time, with so much celerity, that the poor animals were frequently much fatigued, and we were thus often compelled to exchange our mountain-climbing, for visits to more distant, though less inaccessible places. But these exertions, which never produced any painfully fatiguing results in such an atmosphere, were rewarded, besides the temporary and present enjoyment, with the attainment of very choice collections. Most of the plants which we found are nondescripts, and their singular forms will prove as interesting to the systematic Botanist, as to the Botanical geographer, who is justified in drawing from them many new inferences as to the range of individual families. The most beautiful spot is the Pico de Pilque, in the lower part of the valley. The first portion of its side is hardly attained when you come to meadows, where the prevailing herbaceous plants exhibit the general appearance of alpine vegetation, combined with the large foliage and brilliant colours that characterize a tropical growth. The magnificent forms of the *Orchideæ*, few of which are seen in northern Chili, were to me most attractive. One, which the people of Antuco call *Wood-Lily*, (*Azuzena del Campo, Gavilea odoratissima, n. sp.*) always grows in great profusion. The scape, five feet high, is covered for half its length, with golden-yellow flowers, of which the violet scent is diffused to a considerable distance. In drier spots grows another species, of which the flowers are above two inches across, and the white petals of the *calyx* are covered with a reticulation of green veins, and have a strong smell of *Vanilla;* whilst a third kind, with green flowers veined with black, possesses the odour of the common Garden Lack. Other Orchideous plants, with magnificent golden-coloured blossoms, more or less perfumed, frequently but a span high, but with very large foliage, inhabit only the highest summits of the Andes. Many occur solely at the margin of the barren lava that borders the river in the low valley, and flourish on the very driest spots alone, which is quite contrary to the habit of their congeners in other parts of the world, and if they are less splendid than the species just described, they yet excel all the native plants of this same family.[1] On ascending the still higher parts of the mountain, the number of unknown plants increases. In the same situations with the very beautiful myrtle-leaved *Beech,* (*Fagus Dombeyi* of Mirbel,) grows the undescribed Beech of the upper Andes, with several kinds of *Podocarpus,* a second new species of which bears some resemblance to the broad-leaved *Cypresses* of North America. On the margins of the forest grow *Hieracia, Gerania,* and many sorts of *Trefoil, Vetch,* and *Lathyrus,* as if to recall the far distant scenes of our North-eastern native land, while the greater proximity of the singular continent of New Holland is indicated by individuals of the *Protea* family, and *Leguminosæ* with curiously formed fruit. The great affinity between this Flora and that of the extreme point of South America, appears in the presence of a white, woolly *Senecio* and some *Gnaphalia;* while in the large-flowered *Loranthus* there exists a similarity to the singular *Misodendrons,* (which have no right to be placed in the same family, and are called by the Chilians, on account of the peculiar fibrous appendage that surrounds their seeds, *Angel's Beard;*) and finally, in the lofty climbing plant with woody stems, (*Cornidia integerrima* of Hooker,) which resembles the *Viburnum,* we recognize the vicinity of the Tropical Flora of South America. Species of *Berberis,* from the berries of which the Indians prepare an intoxicating drink; *Echites,* with blue flowers, whose roots afford the

[1] The *Orchideæ* which I found on the Andes of Antuco, and which I described, together with some others, in a periodical work (Fragmentum Synops. Phanerog. Chilens. Lips. 1833, p. 13, et seq.) are the following. *Chloræa speciosa, C. viridiflora, C. grandiflora, C. campestris, C. cylindristachya, C. chrysantha, C. nudilabia, C. decipiens, C. alpina, C. incisa,* all these are new species; *Gavilea leucantha, G. odoratissima* and *G. acutiflora,* this is a new genus. *Asarea glandulifera, and A. parviflora; Habenaria pumila,* and *Pogonia tetraphylla. n. sp.*

natives a kind of snuff; several *Anemones* and *Loasas,* of the branching kind, far more dreadfully stinging than are the numerous and comparatively disregarded and innocuous Nettles of the hotter American districts, *Daphnes* and dwarf *Escallonias* surround the traveller as he emerges from the higher woods. Then comes a new zone of this abundant vegetation, while a glance down the giddy steep enables the Naturalist to descry, even by the different shades of green, the separate regions of plants which he has passed, and which no where rise with greater regularity and more accurately defined, than they do in these Andes. A new zone then commences, which might be imagined similar to those regions of the mountains in Northern Europe, if the mild air, the deep blue sky over head, and, between the thick woven trees that cover the ground, levelled by the winter's storms, the violet *Amaryllis* and variously tinted *Alstrœmerias,* did not severally appear to dispel the delusion in which the wanderer may have indulged. It is a work of no small labour to force one's way through the tangled growth, that insidiously envelopes many a sharp stone and many a deep cleft; but no danger is here to be apprehended from poisonous snakes, gigantic stinging ants, or any of those numberless tribes of noxious animals which inhabit tropical climes; as none of them exist in this highly favoured region. Now the last shrub is passed, and the ground becomes more stony, while the increasing purity and coldness of the air cause every respiration to be drawn with a sensation of positive delight. Fresh treasures here burst upon the view, and reward the adventurous mountaineer, who is often compelled to relieve his full heart by uttering loud shouts of joy, to which his faithful dog, the sole companion and witness of his delight, responds by many a yelp of exultation, and by rolling on the snow and playing sundry fantastic gambols. It were useless labour to attempt enumerating here, the individual plants that are successively seen when climbing the highest ridges of these rocks; and, I may only mention that no Naturalist can imagine the alpine Flora of the South of Chili, to be so beautiful to the sight, and so attractive to the scientific observer, as it actually is. All that the Cape of Good Hope and New Holland can exhibit in their arborescent flowers, which without attaining the gigantic growth of tropical forests, are yet inexpressibly charming,—all that the alpine productions of Europe can present, in their miniature forms, and myriads of small leaves, may be found happily blended in the plants of these Andes. As every where in Chili, the *Compositæ* prevail; and you can hardly recover from the surprise of seeing numerous *Senecios,* exhibiting their golden blossoms among their snowy white or grey leaves, when you stumble on blue *Perezias* and low shrubs of the *Amellus,* which bear, united, the foliage of the *Rosemary* and the starry blossoms of the *Aster,* together with the reddish *Lasiorrhiza* and the moss-like *Nassauvia,* species of a genus that is confined to the extreme southern part of South America, and of which three forms are here seen. It is singular to observe how the individuals of such families as do not, in general, affect the cold air of the Andes, grow amongst the beautiful plants just mentioned. *Cassia*-like bushes not a foot high, adorned with large golden clusters of flowers, *Escallonias, Cynanchum, Colletias,* and a little green hyacinth-like plant; these advance to the line of perpetual snow, where first appears that singular *Violet,* which bears its leaves in the regular star-like manner of a *Sempervivum.* Still higher, but not, therefore, beyond the limits of phanerogamic vegetation, the rocks are adorned with several *Cryptogamia,* among which the skilful Botanist will descry new genera, of Ferns that never exhibit their beautiful leaves otherwise than coiled over each other, and which flourish in the deepest clefts. At last, the summit of the lofty Pico is won, and the collector, laden with abundant treasures, rests on its broad flat top, which, though utterly destitute of vegetation, yet awakens fresh interest in his mind, for where accidental fissures occur in the wea-

ther-worn stones, he may find Pistacite of the most beautiful colours, and black kinds of vitrified substance that have been produced by a far more intense volcanic action, thousands of years ago, and which some unknown cause has collected at this extraordinary elevation.

Notwithstanding its vicinity to the clouds, this mountain is not so utterly destitute of subjects of the animal kingdom, as are many lower mountains of the northern provinces, and though the insects do not buzz about here, as in the meadows and woods of the lower regions, many Beetles may be found, creeping among the stones, or feeding on the Alpine plants. Golden green *Cetonias*, dark blue *Curculios*, and *Cicindelas*, which dart on rapid wing, like white sparks on the air, and are very difficult to be captured, live both in the neighbourhood of the snow, and in the woody regions; and the largest of the Chilian Beetles may also be caught, especially a *Lucanus*, that grows to the length of four inches. No small Birds are seen here, but instead of them there are great numbers of *Condors*, which circle around the lonely wanderer, with such boldness, or such rage, probably excited by the vicinity of their nests, that the very strokes of their wings may be felt in the air on his face. On my frequent ascents of the Pico de Pilque, I was obliged to take pistols with me, to scare away a couple of these birds, which wheeled continually around me when I drew near the top, and particularly aimed at attacking my dog, which courageously endeavoured to maintain an unequal war. Difficult as it is to shoot a Condor, except by hitting it on the beak, I fired several times unsuccessfully at these gigantic birds, but at length drove them away, which permitted me, with my faithful companion, to renew the investigation of this wonderful spot. Vast and uninterrupted is the view that is obtained from this mountain, and if the eye does not rest upon a country, where man mingles the thousand marks of his industry with the simplicity of nature, yet is the sight far less painful than what is often presented by South America. A hope, a persuasion rather, takes possession of the mind, that the beautiful tracts that are hence descried, of which the distant horizon alone bounds the view, will, in less than half a century, support an industrious population, and that the solemn silence of teeming nature, which none but the poet would desire should remain unbroken, will ere long yield to the busy exertions of a happy population. Westward lie the plains that, commencing at the foot of the foremost Andes, stretch almost to the sea, and are only traversed by low mountains, and watered by the Biobio, the Laxa, and Duquero, streams which ensure numerous advantages to the future inhabitants of these regions, and are well appreciated by those who fix their habitation in Chili's northern half. Close to the spectator rise the mountains, clothed with luxuriant forests, down whose every side trickle numerous rivulets which fertilize the vallies, and render artificial irrigation unnecessary. The eye rests on the only inhabited spot, the little village of Antuco, whose dwellings look like the work of children's hands, and is nearly lost in the valley. Northward are the gigantic mountains of the Cordillera of Chillon. Widely different is the scene that opens towards the East. Calm in majestic repose, and deceptively near, appears the broad black volcano, which terminates the prospect. Dense pillars of smoke burst from its mouth, and its loud peals of thunder seem as if they would even threaten its very stability. Thus is every thing united that can render the prospect attractive and pleasing, grand and awful. Every fresh visit renders the Naturalist more reluctant to quit this fascinating scene, and to mingle again with every-day life and its bustling concerns, while the solitary hours that he has passed here abundantly reward those inconveniences, and privations, and fatigues to which he is eminently exposed, and linger on his recollection, with an almost sacred tenacity, long after the ocean has reconveyed him to his native and far distant country.

ILLUSTRATIONS OF INDIAN BOTANY.

By Dr. Wight, and G. A. W. Arnott, Esq.

(Continued from p. 228.)

INDIGOFERA TRITA.

(Tab. XVI.)

Herbacea v. suffruticosa erecta rigida pube appressa canescens, foliis pinnatim trifoliolatis, foliolis ovalibus oblongisve mucronatis, racemis sessilibus foliorum longitudine multifloris, floribus parvis superioribus deciduis, segmentis calycinis longis subulatis, leguminibus reflexis patentibusve arcte approximatis ad basin rachidis 4-angulatis strictis rigidis cuspidatis, seminibus numerosis (6—10) tetragonis utrinque truncatis. *Wight et Arn. Fl. Penins. Ind.*

Indigofera trita, *Linn. Suppl. p.* 335. *De Cand. Prodr. v.* 2. *p.* 232. *Roxb. Fl. Ind. v.* 3. *p.* 371. *E. I. C. Mus. t.* 379. *Wallich, Cat. n.* 5449. *Wight, Cat. n.* 856, 857, 858.

I. cinerea, *Willd. Sp. Pl. v.* 2. *p.* 1235. *De Cand. l. c. Spr. Syst. Veget. v.* 3. *p.* 274. *Roxb. Fl. Ind. v.* 3. *p.* 372. *E. I. C. Mus. t.* 380.

I. canescens, *Lam. Enc. Meth. v.* 3. *p.* 251. *De Cand. l. c. p.* 224. *Wall. Cat. n.* 5448.

I. hedysaroides, *Lam. l. c. p.* 250. *De Cand. l. c. p.* 232. *Spr. l. c. p.* 275.

I. arcuata, *Willd. l. c. p.* 1228. *De Cand. l. c.*

I. armata, *Wall. Cat. n.* 5453.

I. rigida, *Willd. Enum. p.* 280. *De Cand. l. c p.* 224.

Stems suffruticose, erect, flexuose, rounded, glabrous, and branching below, but nearly simple, irregularly angled, and hispid towards the extremities. *Leaves* ternate, petioled; *petioles* almost an inch long, furrowed above, and, like the elliptic, mucronate, retuse leaflets, hispid and canescent. *Leaflets* whiter below than above. *Stipules* short, filiform, subulate. *Racemes* axillary, generally longer than the petioles, or even than the leaves, but that the upper flowers prove abortive, and then the extremity of the rachis withers and falls away. *Calyx* 5-cleft; divisions filiform, hairy, persistent. *Corolla: Vexillum* erect, *keel* spurred and elastic at the base. *Legume* 4-sided, 4-angled, the upper and lower ones keeled, hispid, terminating in a sharp spinous process, pointing downwards: the back of the legume curved, so as to resemble, while attached to the plant, an inverted arch. *Seeds* numerous, separated by partitions, truncated at both ends, black.

Indigofera trita is usually found in large patches in pastures, flowering and ripening its seeds during the cool season, where it proves a troublesome weed in consequence of the spinous points of its legumes, which are strong enough to inflict wounds, neither deep indeed, nor dangerous, but which cause considerable pain at the time.

BOTANICAL INFORMATION.

We are requested to give publicity to the following notice respecting a new Botanical Society, which has lately been formed in Edinburgh. The names of the chief office-bearers are sufficient, alone, to confer respectability on the Institution, and we heartily wish it may be productive of all the good to Science, which its founders anticipate. Assuredly, in no part of the kingdom, is such a Society so likely to succeed and flourish as in Edinburgh, where the school of Botany, as connected with the University, is so extensive, where the country is eminently interesting, no less for the variety and rarity of its vegetable productions, as for the almost classical celebrity of many of its localities, and above all, where the estimable character, and ardent enthusiasm of the Professor of Botany, have contributed so greatly to render the study attractive. Scarcely a summer has passed of late, that has not been marked with the addition of some new or exceedingly rare plant to the Scottish Flora, by a band of Edinburgh Naturalists, who have made excursions under the guidance of Dr. Graham.

BOTANICAL SOCIETY OF EDINBURGH.

"Dr. Graham has been elected President, and Drs. Greville and Balfour Vice-Presidents of the Society for the present year.

"The advancement of Botanical Science is the object of this Society. Its operations will, for some time, be confined principally to the holding of periodical meetings, to correspondence, to the formation of an Herbarium, and the interchange of specimens. The last is a new feature in the constitution of such a Society, and will be conducted by a Committee, in accordance with certain rules, embodied in the laws. The desiderata of Botanists, all over the kingdom, will be supplied as far as possible, from the Society's duplicates, and individuals will thus secure the important advantages of exchanging the vegetable productions of their respective districts, for those of others, more remotely situated. The benefits resulting to Science, as well as individuals, by this arrangement, will, it is hoped, be considerable; especially in regard to the geographical distribution of plants in the British Islands, and in the formation of local Floras. The Society, besides, contemplates an extension of this plan, by promoting an exchange of specimens with Botanists in other parts of the world.

"The Members will be divided into the following Classes:—Resident, Non-resident, Foreign, and Associate. Any person desiring to become a non-resident member, must be recommended by two individuals, belonging to some Scientific or Literary Society, and pay a contribution of two guineas, which, without any additional expense, will entitle him, so long as he continues annually to send specimens to the society, to a participation in its duplicates. To become a foreign member, it is necessary to transmit five hundred specimens, including, at least, one hundred species, or a botanical work, of which the candidate is himself the author; the former alternative only entitling him to a share in the society's duplicates. To continue to participate in these duplicates, he must afterwards contribute, annually, three hundred specimens, containing at least fifty species.

"The Flora of Edinburgh, which is particularly rich, will afford a constant supply of valuable duplicates, and others will be regularly obtained from other parts of Scotland, especially the rarer alpine species.

"Local Secretaries will be appointed in different parts of the kingdom. In the mean time, communications are to be addressed (postage paid) to the Secretary, W. H. Campbell, Esq., 21, Society, Brown Square, Edinburgh."

Intelligence has been lately received from Mr. Mathews, who was in Chacapoyas, at the date of his last letter, which was addressed to John Mac Lean, Esq., of Lima, 27th September, 1835. He describes himself as having made very considerable collections of Birds and Plants, and as having prepared many drawings; all which were ready to be sent to this country: but the state of affairs in the districts between Lima and Chacapoyas was such, that he had not ventured to dispatch them to the coast. It will be seen from our notice respecting Mr. Mathews, at page 19 of this volume, that this indefatigable collector has thus followed up the intentions there expressed of returning to Chacapoyas, where a previous visit of two months served to assure him that a great deal more was to be done in the way of Botany than could possibly be accomplished in that space of time.

We are indebted to a friend, who has lately visited Paris, for some interesting particulars respecting the progress of Botany in France. The greatest change observable since this gentleman's last visit to Paris, about three or four years ago, is in the activity of the present administration of the Museum of the *Jardin du Roi.* M. Adrian de Jussieu, M. Adolphe Browgniart, and their coadjutors, M. Guillemin and M. Decaisne, are all young and zealous as well as excellent Botanists, and

have made considerable progress in the putting into accessible and useful order the rich materials the Museum already possesses, and the administration generally is making considerable exertions towards increasing the collections. Their plan is to have a general herbarium, as complete in species, and in habitats as possible, and besides that, to have separate geographical herbaria. What duplicates may remain, are reserved for the purpose of making exchanges. M. de Jussieu, by an active correspondence with collectors, as well as by a tour he made last year, in the southern departments, has succeeded in forming a very rich and complete French herbarium —a matter certainly of the first importance in a national collection. The additions to the general herbarium are not so great as might have been, had the fund at the disposal of the Museum been more considerable; yet very important ones have lately been made, amongst which you are already acquainted with Jacquemont's Cashmire and Himalayan collection, and much is expected from Le Prieur's Guiana expedition. The latter collector was formerly with Perrottet, in Æquinoctial Africa, and has since been sent out by the Parisian Geographical Society, to French Guyana, to explore the affluents of the Oyapook, on a mission, and with means, very similar to those entrusted to Schomburgk by us. With regard to Botany, he is to send his specimens to the Museum and to M. Delessert. Some have been already received, many of them valuable species, but mostly not so well dried as might have been wished. Unfortunately his health is impaired so much as to give serious fears that he will be unable to fulfil all the objects of his mission.

Baron Benjamin Delessert continues, and indeed has lately much increased, the encouragement he gives to Botany, and to botanical collectors. Besides subscribing to all English and German expeditions, which appear deserving of encouragement, he zealously promotes several French undertakings of the same nature. Perrottet, who was with Le Prieur, in Senegambia, has been appointed to the situation of Director of the Botanical Garden of Pondichery, in lieu of Belanger, who some years ago, returned to this country; but as this Botanical Garden can scarcely be said to exist, Perrottet is earning his salary by plantations, and other improvements of the kind about the town, and by botanical excursions in the surrounding country, from whence he has already transmitted to Baron Delessert, a considerable collection, richer in the number and quality of its specimens, than in any novelty of species, which are, of course, the same as those we usually receive from the Coromandel Coast.

M. Picard, a young man who has already made some good collections in the South of Spain and other parts of the Mediterranean, is about to sail for Gabon, on the Coast of Senegambia, from whence he will transmit to Delessert the dried plants he may collect.

M. Adolphe Delessert, a nephew of the Baron, accompanied Perrottet to Pondichery, and from thence has made a voyage to Singapore, Penang, Batavia and Borneo, and on his return to Madras has transmitted, besides a large quantity of birds, (Zoology being his special pursuit,) several plants which he collected for his uncle.

M. B. Delessert himself is continuing his Icones Selectæ; several of the plates of the third volume, engraved by Plee, under the immediate superintendence and editorship of Guillemin, are already finished and the work is now rapidly proceeding with.

M. Adolphe Gay is actively collecting in South Chili, chiefly in Valdivia.

M. Coquebert de Montbret, a nephew of the traveller of the same name, who died in the Egyptian expedition, has lately returned from a most interesting journey. He went from Constantinople over the Bithynian Olympus, and across the chain of the Taurus to Aleppo; thence up the Euphrates nearly to its source, and across to Trebizonde, from whence, nearly by the same route, he returned to Aleppo. He had with him M. Auber, who, during a part of

the time, made an excursion by himself to North Syria, and formed a very valuable botanical collection.

M. Adr. de Jussieu is about to print his Memoir on the *Malpighiaceæ*, on which he has been some time engaged.

Great improvements have been made lately in the *Jardin des Plantes*, under the able direction of M. Mirbel. Of the range of houses, there are to be two pavilions, (of which one is nearly completed,) for *Palms*, almost cubical, and forty feet in height, their whole sides, front, and roof, are of glass: thus giving them a very light appearance. The boxes in which the *Palms* are planted, are placed in a pit eight or nine feet deep, in which they are so raised that the top of the box is on a level with the floor of the house, which makes them look remarkably well. The houses are heated with steam. M. Mirbel, who is so zealous in furthering the interests of the garden, is also still much occupied with physiological researches, and has lately been engaged in examining the *Gingko* in a state of germination, from seeds which ripened at Montpellier, where they have both sexes of the plant.

D. Moore, Esq., who has been some time engaged in examining the botanical productions of the county of Londonderry, for a work which is to form part of the "Statistical Account of the Ordnance Survey of Ireland," has been rewarded by the discovery of many rarities, of which some are quite novel to the Flora of the sister kingdom, and one is altogether new to the British Isles, the *Carex Buxbaumii* of Wahlenberg, which was detected on an Island of Lough Neagh. The nearest affinity of this plant is with the very scarce *C. tomentosa*; but Mr. Moore and Mr. Mackay at once correctly distinguished it from that species, by the less downy and longer fruit; the strongly mucronate scales, and above all, the absence of a wholly male spikelet; the *base* of the upper female spikelet being alone furnished with male flowers. It will rank next to *C. Vahllii*, and indeed, together with it and *C. atrata*, should form a separate section, distinguished by the circumstance above mentioned, of the upper spike being androgynous;—male below, and stigmas three. The character may be thus rendered.

Carex *Buxbaumii;* spicis sub 4 sessilibus approximatis oblongis, terminali androgyna, squamis ovato-lanceolatis longe (masculinis brevi) cuspidatis, capsulis ellipticis substipitatis leviter pubescentibus obtusis bicuspidatis, bracteis foliaceis vix caulem superantibus, vaginis nullis. —*C. Buxbaumii, Wahl. Act. Holm. f.* 803. *p.* 163. *Fl. Lapp. p.* 244. *Fl. Dau. t.* 1406. *Mackay, Fl. Hib. ined.* —*C. polygama, Schkuhr. Caric. tab.* G. g. *f.* 76.

Hab. One of the small Islands of Lough Neagh, County Derry, *D. Moore, Esq.*

The *Hieracia* of our country need a thorough revision; though I fear that the many-leaved and many-flowered ones are so extremely variable, that it will be no easy task, with the best materials, to determine them satisfactorily.* I had, myself, been led to doubt if the real *H. Sabaudum* was a native of this country, from the circumstance of the figure in English Botany not exactly according with my continental specimens: but, in this opinion, I believe, I am mistaken; for I have lately received many specimens, which I am satisfied are the true *Sabaudum;* as, for example, from near Leamington, Warwickshire, *Dr. Lloyd.* County Derry, Ireland, *Mr. D. Moore.* Richmond, Yorkshire, *Mr. J. Ward.* Near Warrington, *Mr. W. Wilson.* Near Nottingham, *Dr. Howitt*, with more entire leaves; and elsewhere. But these specimens have, in several instances, been accompanied by others, which I have been quite unable to name satisfactorily. On a wall, by Leamington, Dr. Lloyd finds an *Hieracium*, with narrow leaves, and more numerous flowers than in the true *H. Sabaudum;* thus being identical with my Loch Rannoch specimens of what I have called *H. denticulatum*, in the British Flora, the very station of

Smith's *denticulatum* of English Botany (*H. prænanthoides* of the same author in Fl. Britannica). My *H. prænanthoides*, (Brit. Fl. ed. 3. p. 352,) which I believe to be the same with that of Eng. Bot. t. 2235, again, scarcely differs from *H. Sabaudum*, except in the softer texture of its leaves, and more glandular calyx. May not these three be referable to one and the same? The authors of the "*Compendium Flora Germaniæ*," Bluff and Fingerhuth, say of *H. Sabaudum*, "Planta valde varians, caule nunc humili subsimplici, nunc altissimo apicem versus magis minusve corymboso, foliis longioribus brevioribus, angustioribus latioribus, profunde dentatis aut integerrimis, dentibus nunc basi nunc in medio majoribus, aut omnibus subæqualibus. Periclinii (Involucri) foliola nigricantia, pilis paucis hinc inde glanduliferis adspersa."

Mr. Moore has observed that *Scirpus Savii* is very abundant in the county of Derry, and probably throughout Ireland; and he confirms a remark I have already made in this Journal, respecting its occupying nearly the same range as *Pinguicula Lusitanica*. He finds both growing together in various places.

A new station has been discovered for the *Veronica Buxbaumii*, by Miss Anna Gurney, who has observed it for some years under a sunny wall at Syderstrand, between Cromer and Trimingham, Norfolk. This year, (1836,) its large and brilliant blossoms were in perfection on the 18th of March.

Mr. Gay, of Paris, after a careful examination of the plants of M. Durieu, and especially of those common to the summits of the peaks of Arvas, and of Canellas, mentioned at p. 216 of this Journal, has been kind enough, through Mr. P. B. Webb, to suggest the following corrections;

The *Leontodon*, without name, is *L. squamosum*, Lam. (*Apargia alpina*, Willd.)

Juniperus depressa, is *J. nana*, Willd. —*J. communis*, var.

Agrostis rubra, is *A. alpina*, Scop.

Agrostis Asturica, is *A. capillaris*, L.

Aira Asturica, is *A. flexuosa*, L.

Bunium Bulbocastanum, is *B. denudatum*, D C.

Silene geniculata, Lag., is *S. ciliata*, Pourr.

In the collection of M. Durieu, are about fifty species of great interest, "mes quinze derniers jours," says M. Gay, "avec les nuits, ont été employés à les determiner."

EXTRACT OF A LETTER FROM M. SPANOGHE, THE DUTCH RESIDENT AT COUPANG, RELATING TO THE NATURAL HISTORY OF THE ISLAND OF TIMOR; WITH SOME ACCOUNT OF THE UPAS TREE, DISCOVERED THERE BY THAT GENTLEMAN.

M. Spanoghe, during a long stay in the Island of Java, is well known to have devoted a great deal of time to the investigation of its Natural History, and, we believe, has sent very considerable collections to his native country. Since then, he has been appointed to the Presidency or Governorship of Coupang, the Dutch settlement of Timor, and has there equally furthered the cause of Natural History, and dispatched to Holland a very valuable Herbarium, which will doubtless afford Dr. Blume many interesting subjects for his forthcoming "*Rumphia*," announced at p. 81, of our present volume. In the mean time, whatever concerns the Natural History of the Island in question cannot fail to be read with interest: and, in a letter lately received from him, which bears date "Coupang, 28th September, 1834," Mr. Spanoghe observes;

"The soil of Timor is not very favourable for *Ferns*, or any other *Cryptogamia*, being too dry, and the limestone formation, thus producing very few of those plants, which delight in a moist soil, such as the *Orchideæ*, and many others. These Islands are also quite destitute of plants belonging to the following orders: viz., *Dilleniaceæ*, *Magnoliaceæ*, *Berberideæ*, *Papa-*

veraceæ, Bixineæ, Acerinæ, Eleagneæ, Styraceæ, Plantagineæ, Cunoniceæ, Valerianeæ, Saxifrageæ, Melastomaceæ, Opuntiæ, and *Coniferæ*. The general aspect of vegetation here, is very different from that of Java, though, upon examination, I find many plants, which are common both to that island, and to all India. The soil and productions of Timor, however, bear more analogy to those of the Isle of France and of Bourbon, than any other places.

Timor produces only one *Eucalyptus*, which is a lofty Tree with a white shining bark; and also *Leucadendron viridiflora*, but no other plants which grow in New Holland, or Australia. The *Sandal Wood* is the spontaneous productions of our hills, but is not to be found on any of the neighbouring islands, except Sandal Wood Island. The *Tamarind Tree*, several species of *Inga* and *Acacia, Borassus flabelliformis*, and *Eucalyptus alba*, being among the largest trees, and conspicuous from a distance, give a peculiar character to the dry rocky hills of Timor. This island cannot boast of its spices; a solitary species of *wild pepper*, one wild *Myristica*, and a *Litsæa*, are all that are found here. Nature seems to have assigned a certain and limited range to all useful plants, and the *Sandal Wood* appears to be allotted to Timor; still this country possesses a very fine Flora, and its soil is not unsuited to many of the most useful vegetable productions, as we have *Potatoes*, all kinds of *Yams, Wheat, Rice, Indian Corn*, every sort of culinary herbs, and very good *Coffee:* the beans of the latter being somewhat of the Bourbon kind. Of the eatable fruits that grow in Java, we have very few; no *Mangosteen, Doe, Ramboetan*, nor *Pine Apple*, but a great variety of *Oranges*, and of the Cucurbitaceous fruits. We miss here, also, the poisonous milky plants, so common in the Islands of Sunda, and it is a very singular, as well as a favourable circumstance, that Timor and the adjacent Islands, are entirely exempt from all noxious animals, as *Snakes*. There are no *Tigers* or any other beast of prey, and we are not endangered by the presence of the *Elephant*, or *Rhinoceros*, in our woods, where the largest creature is a species of *Stag*, with some wild *Hogs*, and a kind of *Monkey*, which is found in Java, and elsewhere.

As to its *Birds*, Timor seems to occupy a middle rank between New Holland and the Islands of Sunda, more species of *Psittacus* being found with us, than in the latter regions, while the same may be said of those birds which feed on insects, as the many kinds of *Wagtail* and others, which are all different in colour and size, and a similar remark holds good of the genus *Passer*. Neither *Peacock* nor *Pheasant* is seen here, but a very rare kind of bird appears to be peculiar to one of the islands of this groupe, namely, *Semáo*, and will probably prove a new genus of the *Gallinaceæ*. Its native name is *Poklaka;* it lays its egg on the ground, covering it afterwards with earth; the egg is as large as that of a goose, and the bird itself, the size of a *New Guinea Fowl*.

As for *Minerals*, Timor has been long known to afford *gold* and *copper*, and I expect that it will turn out to be a fine field for the Mineralogist. Its hills would be called by the Geologist, a *transition formation*, as evidenced by the conglomerate *sandstone*, and its primitive hills consist of *schistus* and *porphyry*, the *gold* being found in the first; while the porphyry produces *copper*. Neither of these valuable metals exists, however, in such quantities as to repay the expences of mining. The rocks along the coast are of the *limestone formation*, and of much more recent date than the central parts of the island; the same limestone exists on the coasts of the other islands between us and Java, and in those nearer Timor, as Semáo, Rotte, &c., which exhibit evident marks of their still being under the agency of a submarine Volcano.

J. B. SPANOGHE.

Since the above was written, I made a trip to the interior, leaving my parcel at Coupang, to be forwarded by the first ship,

but no opportunity having occurred, I found my letter as I left it, and now add, for your information, that I met with several trees growing on the hills, which, had I not seen fruit and flower of them, I would have taken for a species of *Ficus*. But to my astonishment, I found them, on a closer examination, to resemble the *Antiaris*, and to be very similar in every respect to the well known species, *A. toxicaria*. I never saw the Upas Tree myself, and the drawing that had been shown me, was without its fruit. But what surprises me most is, that the milk of my plant, which coincides, in every point, with the description of Horsfield, seems not to be poisonous at all, at least when unmixed and fresh, for I have tried and made several experiments with it on animal life, and have administered it internally, to monkies, fowls, &c., without any effect.

I am very happy to have met with a good opportunity of forwarding you some of the fruit, and the male flowers of this dubious plant, in spirits, with some other seeds, which, I trust, will reach you in safety. You will oblige me by giving me your opinion on this plant, which for the present I call *Antiaris dubia*. Rumphius's description of the seeds of the *Macassar Upas*, corresponds very well with my samples."

" *Coupang, Nov.* 6, 1834.

I need scarcely say that so interesting a plant as that now mentioned, immediately attracted my attention; and the result of my examination, together with the most authentic particulars relative to the nature of this celebrated poison, are here subjoined.

ON THE UPAS ANTIAR, OR "POISON TREE OF JAVA," FROM THE ISLAND OF TIMOR.

(TAB. XVII.)

ANTIARIS. *Lesch.*

ORD. NAT. URTICEÆ, inter *Brosimum* et *Olmediam.*—SYST. LINN. Monœcia Tetrandria.

CHAR. GEN. MASC. *Involucrum* multiflorum peltatum disco floribus tectum. *Calyx* tetraphyllus. *Stam.* 4.

FÆM. *Involucrum* urceolatum, uniflorum, squamosum. *Cal.* o. *Ovarium* cum involucro cohærens, uniovulatum, ovulo pendulo. *Stylus* bipartitus. *Drupa* ex involucro aucto formata. *Semen* exalbuminosum. *Embryonis radicula* supera. *Br.* (*paucis verbis mut.*)

Antiaris *toxicaria;* foliis pubescentibus, involucris parce squamosis, squamis obsoletis glabriusculis. Tab. XVII.

Antiaris toxicaria. *Lesch. Ann. du Mus. v.* 16. *p.* 459. *t.* 22.

Antiaris dubia. *Spanoghe, MSS.*

Hab. Java. Mountain woods of Timor, near Coupang. *M. Spanoghe.*—Fl. Sept.

DESCR. A *tree* of considerable height. *Leaves* deciduous, oblong-oval, sometimes approaching to ovate, shortly acuminate, entire, downy, reticulated, especially beneath, where they are slightly ferruginous, with the nerves prominent: their length is from three to five inches, the base is slightly cordate, and oblique: *petiole* 3—4 lines long. *Flower* monœcious. *Masc. Receptacle,* a flattish, peltate, fleshy, somewhat quadrangular disk, at first plane, a little convex above, slightly convex beneath, and there marked with a few small tuberculiform scales, the margins crenate; at length the sides bend back, and the disk becomes prominent. *Peduncle* solitary or two to four together, arising from the axils of the leaves. The whole surface of the disk is crowded with *male flowers,* each consisting of four erect, obovate, or almost spathulate scales, remarkably incurved, almost cucullate at the apex, a little irregular, but not ciliated at the margin, each sheltering an inverted yellow *stamen,* of an oblong form, of two longitudinal cells; *filament* almost none. *Fæm.* solitary in the axils of the leaves below the male flowers. *Peduncle* thickish. *Involucre* ovate, or almost urceolate, marked with a few raised points, or small scales, the mouth acute, obscurely toothed, scarcely multifid. *Ovary* of the same shape, incorporated with the involucre, 1-celled, with an inverted ovule. *Style* bipartite,

branches subulate. *Fruit* a *drupe* of an oval form, velvety, the outside formed by the adnate involucre, marked with a few indistinct scales of a purple colour: *Nut* large, oval; the *testa* crustaceous, dark brown, containing the large *embryo*, destitute of *albumen*. *Cotyledons* large. *Radicle* superior.

TAB. XVII. *Fig.* 1. 1. Receptacles of male flowers, *slightly magnified.* 2. Single flower from the receptacle. 3. Female involucre, including its flower, with the two cells, *nat. size.* 4. Section of ditto, *magnified.* 5. Section of the fruit, showing the Nut with the Embryo, *nat. size.*

Such is the account I have been able to draw up, from the drawing and notes sent to me by M. Spanoghe, aided by flowers, male and female, and perfect fruit, preserved in spirits. I confess, I at first entertained doubts, whether I ought not to refer this plant to the *Antiaris macrophylla* of Mr. Brown, described by him, and found on the North coast of New Holland, rather than to the Javanese *A. toxicaria*. In the form and size of its leaf, it agrees best with the former; while in the flowers and fruit, it has the most entire accordance with the latter: and even in regard to the foliage, I have only to remark, that the leaves are larger, and less obtuse, than in the figure given by Leschenault. Mr. Brown describes the leaves as "glaberrima," in Leschenault's and our plant they are rough with pubescence, both above and beneath: while, in Mr. Brown's plant, the involucres, both male and female, and the apex of the fruit, are far more scaly, and strongly ciliated, and, as well as the calycine leaflets, even villous. There is, then, I am persuaded, every reason to believe our species to be the same with the famous "*Poison Upas of Java*," to which Mr. Brown's *Antiaris* is also very closely allied.

Not only was the Poison *Upas* clearly defined by M. Leschenault, but to him we are indebted for the first authentic account of its history and properties; and as these are little known to the English reader, I shall offer no apology for making the following extracts from that gentleman's highly interesting memoir, published in the 16th volume of the Annales du Muséum d'Histoire Naturelle, p. 459, &c.

"In equatorial regions, the juices of plants, being continually, as it were, distilled by the effects of their never-checked vegetation, possess much stronger properties than those of temperate countries, and in both beneficial and noxious plants they are more powerful. This fact is proved by the great number of valuable productions which we are obliged, at great cost, to procure from hot climates, for our use both in the arts and medicine. If some of these products can be replaced by analogous vegetables, growing in our own regions, the quality of the latter is sure to be very inferior, and their efficacy much less considerable.

"It cannot admit of doubt that those vegetables which have been selected by the inhabitants of the places where they grow, for the purpose of poisoning their arrows, must be eminently virulent: but these poisons, which often minister to the cruelty and cowardice of those who employ them, are concealed in different forms in their respective plants, various processes being used to extract them. Man, who ever avails himself of all the means that can add to his power, seems to have detected this fatal secret of nature almost every where, and to have increased its effects in many different ways, both by the substances that he has added to augment the activity of these poisons, and by the manner in which he has employed them.

"The use of poisoned arrows may be traced back to very remote antiquity; the Gauls employed them, but only in the chase; while the Scythians and Brachmans attacked the Macedonians with them. Still, universal as is the use of these weapons in the hot regions of both hemispheres, our European travellers, either deceived by the natives who always make a great secret of these direful preparations, or careless about obtaining the necessary details, have hitherto given but very vague and uncertain information, either as to the effects of these poisons, or the plants which

produce them. The savages of Surinam imbue their darts with the poisonous juice of a large tree, but the very genus of this tree is unknown; the *Ahouaignuecu*,[1] the *Piana* or *Curara*,[1] and the *Woorara*,[1] which grows on the banks of the Amazon's river, respectively serve the native of America for the same purpose; but no description has ever been given of these plants.

"M. de la Condamine, in his account of his journey, speaks somewhat in detail of the poison prepared by the *Ticunas*, into the composition of which, he assures us, that more than thirty kinds of roots and vegetables, especially several climbing plants, are made to enter, and which is extensively used upon the shores of the Amazon river; but he affords no information as to what any of these plants are.

"The famous poison employed by the Indians of the Molucca Archipelago, and of the Islands of Sunda, known by the names of *Ipo* or *Upas*, (both signifying *vegetable poison*, in the native language,) has specially excited the curiosity of Europeans, because of the marvellous and exaggerated accounts with which the natives of those countries have delighted in ornamenting their narrations. These popular stories have been collected and confidently repeated by travellers, whose excellent observations and lengthened labours have entitled them to credit. The indefatigable Rumphius names the tree which yields the *Ipo, Arbor Toxicaria*. He has repeated all that was told him by the aborigines and given an imperfect description and figure of the tree, from a branch and one of the fruits, which had been sent him. I have every reason to believe, that he has been deceived, at least, as to the authenticity of the fruit, which certainly was not produced by the tree which yields the poison in question.

"The Naturalists of Europe, unwilling to give credence to the numerous fables promulgated on the subject, desired to ascertain, correctly, the nature of these poisons; but so strict is the secresy preserved on the subject by the natives, that the researches made at Java, and elsewhere, proved fruitless, as they only refuted the idle tales that had been spread, without eliciting any real facts. When I started for my voyage of discovery in Australia, the learned and estimable Professor, M. de Jussieu, urged me, in case I should land at Java, to obtain all possible information on this point, and my own wishes being equally strong, and seconded by fortunate circumstances, the perseverance with which I pursued the subject was finally crowned with a success which enables me now to speak positively about it.

"I have obtained, not only the two kinds of poison or *Upas*, which are collected and prepared in Java; but those also of the Islands of Borneo, and Macassar, and have brought a large quantity of them to Europe, with which my friend, M. Delille, the Physician and Botanist to the Egyptian expedition, and M. Magendie, have made many interesting experiments, displaying the activity and peculiar mode of operation of these poisons on the animal economy. These experiments, performed with great dexterity and care, have formed the subject of two memoirs, read at the Institute, and of a dissertation by M. Delille, presented to, and adopted by, the Faculty of Medicine, at Paris.

"I now proceed to give the history of these poisons, with the manner of their preparation, and a description of the plants which afford them.

"It was at Sumanap, in the Island of Madura, that I obtained the poison that is called *Ipo* in the Island of Borneo. A boat arriving from this country, had on board one of those men who live in the interior of the mountains, and who are called *Orang-daias:* these people are easily known, because they all tattoo their arms with a blue substance, which I believe to be Indigo. They alone, in the whole Island, possess the secret of those plants which furnish the *Ipo*, and the manner of preparing it, and they carefully preserve it rolled up in the leaves of the Palm

[1] See the Supplement of the Dictionary of Science, nder the head of *poisoned arrows*.

Tree. The *Orang-daias*, whether to check the curiosity of strangers, or to magnify the interest which always attaches to those who have performed a hazardous enterprise, talk a great deal of the dangers that are incurred in obtaining the *Ipo;* he, whom I saw, carried an air-tube armed with a dart, and a small quiver full of poisoned arrows, the most usual weapons of these people, whether for the chase or in war; these I purchased from him, as well as three rolls of *Ipo*, concerning the collecting and preparing of which he gave me no rational information. The only positive statement that he made, and of which I afterwards ascertained the truth, was that this drug was compounded with the juice of very large climbing plants. The arrows made by the *Orang-daias*, are formed of strips of cleft Bamboo, about eight inches long, and very thin; the top is furnished with a bit of pith, very like that of the Elder, which serves to expel the dart from the air-tube by means of the breath. Those arrows which are used in hunting, have their tips shaped like the head of a lance, and imbued with *Ipo;* those intended for war, are furnished with a little shark's tooth, or a small copper blade, which is lightly inserted into the dart, and fastened there by the gummy resin of the *Ipo;* the warmth of the blood dissolving this substance, the point remains sticking in the wound after the arrow has been extracted, and the poison mingling with the blood causes speedy dissolution. I made several experiments with the little arrows dipped in *Ipo*, upon chickens and a dog, the former expired in from one to three minutes, according to the quantity of poison infused into the wound; the dog lived for eight minutes, the arrow having been driven for half an inch into the thigh, and allowed to remain there; all these animals died in violent convulsive tetanus, which threw them on their backs, and came on at intervals.

" The Orang-daias showed me the manner in which the *Ipo* is moistened and applied to the arrows. He took the root of a species of *Menispermum*, called by the Malays, Touba; and expressed the juice, which he mixed with the *Ipo*, and then added to it the root of *Dioscorea triphylla*, putting them together into an iron pot with some water, over a fire; he made a small hole in the lid of the pot to permit the escape of the steam, in the vapour of which he softened the *Ipo*, and spread it over the arrows: this was the mode always employed, he said, in his country, as it revived and added new virus to the poison.

" The Macassar poison, also named *Ipo*, was brought me by my friend M. Carrega, the captain of a vessel in the Dutch service, on his return from a voyage to that country. He learned that it was a gum-resin, flowing from a large tree, to which was added the juice of the root of *Amomum Zerumbet*, called by the Malays *Lampouiang;* other particulars that he gave me proved, however, that this poison was not similar to the Javanese, of which I am going to speak.

" There are two species, known by the name of Upas, with which the inhabitants, principally of the Eastern part, imbue their little bamboo arrows, which they fling with the sarbacane, or air-tube, and of which they make use in the chase: they also mix up the *Upas* with rice, or with fruit, and make a bait of it, which they administer to various animals, and which quickly destroys life: the flesh of the creatures thus killed, or which die of the poisoned arrows, is not at all affected, and it is only necessary to remove those portions with which the poison has come into immediate contact. The plants which produce these two noxious drugs grow only in the province of *Bagnia-Vangni;* one is called *Upas Antiar*, the other *Upas Tieute;* the latter, the produce of a kind of Vine, (*Strychnos Tieute,*) which grows in the woods, is much the most virulent, and the least generally known, because the natives keep the mode of its preparation a strict secret among themselves, and this process is much more complicated than in the case of the *Upas Antiar*. M. Deschamps, Naturalist of the expedition commanded by

General d'Entrecasteaux, observed and ascertained the tree which affords the *Upas Antiar* at Java, and has given some information in the first volume of Travels respecting it, which is correct, so far as it goes, but is deficient in details. M. Deschamps states, with truth, that the Javanese make a secret of its preparation, and confesses that he has been unable to find it out. For some time after I arrived in Java, my enquiries were equally unsuccessful; at Batavia and Samarang, I learned absolutely nothing respecting it, for I only heard some ridiculous stories, which I abstain from repeating. At Soura-carta, the residence of the Emperor of Java, I was told that the Upas grew in the province of Bagnia-Vangni, a place which I visited in the close of July, 1805. A Javanese, whom I took into my service, and who killed birds for me with the arrows steeped in *Upas Antiar*, pointed out to me the tree which afforded this poison, and taught me the mode of its preparation by doing it in my sight.

"The *Upas Antiar* is prepared with the gum-resin which flows from a very large tree, from incisions made in its trunk. The preparation of this poison is done cold, in an earthen jar; to the gum-resin are added the seeds of *Capsicum fruticosum*, *Pepper*, *Garlic*, the roots of *Kæmpferia Galangas*, and those of *Costus Arabicus;* all these bruised substances being slowly mingled together, except the Capsicum seeds, which are hastily thrust, one by one, to the bottom with a small wooden skewer: each seed causes a slight fermentation, and then rises to the surface, when it is taken out and another put in, to the number of eight or ten, when the process is complete. The effects of the *Upas Antiar* on the animal system are less speedy than those of *Upas Tieute*, nor is its mode of preparation the same. A small water-fowl, which was scratched on the thigh with a dart, dipped in this newly-prepared poison, died at the end of three minutes; it had a strong convulsion when in the act of expiring, and the contents of the stomach came out at the beak. An Azurin, a peculiar bird of this country died in the same space of time and with similar symptoms. With all the animals poisoned by the *Upas Antiar*, there were violent evacuations, both upwards and downwards, generally green and frothy. M. Delille, to whom I gave a large quantity of this substance, has made, with his usual sagacity, a great number of experiments, which all produced the same results, and proved this poison to operate at first as a vomit and cathartic, and then to affect the brain, and disturb its functions, causing death with tetanic convulsions. The *Ipo* of Macassar acts in a similar manner, and, from the accounts given to M. Carrega, is also the product of a large tree, and obtained by incision, which identity of circumstances and name, together with the similarity of the climates where they grow, give ground for believing it to be identical with the *Upas Antiar*. The same reasoning holds good of the *Ipo* from Borneo, which is the juice of large climbers, and acts like the *Upas Tieute*, which it resembles also in its intensely bitter flavour. I therefore believe the substance to be the same, though its mode of preparation is different. In Java, the prepared poison resembles thick and very brown molasses, and is contained in small bamboo tubes, such as that which I obtained. That from Borneo, on the contrary, is concrete, and kept in palm-leaves; its dry consistency is obtained by being mixed and braided up with a kind of earth. Having dissolved some of the *Ipo* from Borneo in water, a brown and friable substance was precipitated, which after having been washed in several waters and dried, possessed only a slightly bitter flavour.

"The Javanese arrows are different from those which are used by the inhabitants of Borneo. The end, instead of being shaped like the head of a lance, is so very slender and elongated, that it breaks very readily, and remains imbedded in the wound, and as M. Delille has correctly observed, the smaller the opening, the more dangerous it is, because, when the

laceration is considerable, the hæmorrhage that follows frequently carries away the virus, which it gradually dissolves, and either weakens or totally destroys its effect.

"The Javanese state that sea-salt, taken in large quantities, is an antidote to this poison; but my own experiments, as well as the subsequent ones made by M. Delille, seem to prove that this remedy is almost entirely, if not quite, inefficient, and only increases the sufferings of the victim.

"I noticed myself, and M. Delille has confirmed this observation, that the liquid poison, introduced into a wound, is much less virulent than when it has dried upon the instrument which inflicts the incision. Probably the fluid state causes it to mix readily, and to be carried away by the blood which flows out; whereas, in the other case, it is gradually absorbed while it dissolves. In the serous cavities and the digestive organs absorption is quickly effected, though the *Upas* may be mingled with a large quantity of water, or mixed as a liquid in food.

"I proceed to describe the *Upas Antiar* Tree. It is monæcious, and belongs to a new genus, which I have called *Antiaris toxicaria;* it is very lofty, and I invariably found it growing in fertile spots, surrounded by a profusion of vegetables, which seemed to be entirely uninjured by its proximity. The trunk is straight, and furnished with excrescences at the base like that of *Canarium commune.* Its bark is whitish and smooth, and the wood white; the leaves fall off before the blossoms appear, and do not shoot again till the male flowers are over, and the fecundation of the germen is effected: they are oval, coriaceous, generally crisped, pale green, and of a dry consistency, rough to the touch, and covered with little short and harsh hairs. The foliage of the very young plants of *Antiaris* is different from that of the full-grown trees; each leaf is about six inches in length, almost sessile, slightly spathulate in shape, a little toothed at the margin, and less harsh than in the old individuals. The juice of the tree is very clammy, and of a bitter flavour; that which exudes from the young branches is white, while what flows from the trunk is yellowish, and abundantly follows any incision made in the bark.

"The vapours of this juice, like those which are developed by several *Shumachs* and *Euphorbias*, and the *American Manchineel*, are dangerous, and particularly so to some persons, whose skin or constitution is peculiarly apt to absorb these emanations, while others are not affected by them, as was proved by the following event:—

"The tree which afforded the specimens of the *Upas* poison and of the inflorescence which I brought home, was more than 100 feet high, with a trunk about 18 feet in circumference near the base. A Javanese whom I commissioned to bring me down some flowering branches of this tree, was obliged to make notches in it to enable him to climb; but he had hardly got up so high as 25 feet from the ground, when he proved ill, and was compelled to descend. He became swollen, and continued sick for several days, suffering with vertigo, nausea, and vomiting; while another Javanese, who climbed to the very top and brought what I wanted, was in no way incommoded. Having afterwards caused one of these trees, which was four feet in circumference, to be felled, I walked among its broken branches, and my face and hands were sprinkled with the gum-resin which dropped upon me, and I was not at all affected; it is true that I took the precaution of washing myself immediately. The vicinity of the *Antiar* is not injurious to animals; I have seen lizards and insects upon its trunk, and birds perched upon the branches."[1]

[1] Not so according to the older writers on the *Upas*.

"Fierce in dread silence on the blasted heath
Fell *Upas* sits, the hydra-tree of death.
Lo! from one root, the envenomed soil below,
A thousand vegetative serpents grow;
In shining rays the scaly monster spreads
O'er ten square leagues his far-diverging heads;
Or in one trunk entwists his tangled form,
Looks o'er the clouds and hisses in the storm.
Steeped in fell poison, as his sharp teeth part,
A thousand tongues in quick vibration dart;
Snatch the proud eagle towering o'er the heath,
Or pounce the lion, as he stalks beneath;
Or strew, as marshall'd hosts contend in vain,
With human skeletons the whitened plain."

A short extract from Dr. Horsfield's account of the *Upas*, given in the Memoir of Sir Stamford Raffles, may be interesting. "This tree is one of the largest in the forests of Java; the stem is cylindrical and perpendicular, rising, completely naked, to the height of 60, 70, or even 80 feet. Near the surface of the ground it spreads obliquely, dividing into numerous broad excrescences or appendages; it is covered with a whitish bark; close to the ground this bark is, in old trees, more than an inch thick, and upon being wounded, yields plentifully the milky juice from which the celebrated poison is prepared. The sap is contained in the tree-bark or cortex. The inner bark or liber of young trees is employed by the poorer class of people in making a coarse stuff which they wear when working in the fields; but persons clad in this dress, on being exposed to the rain, are affected with an intolerable itching, which renders their flimsy covering almost insupportable. The deleterious quality of the poison resides in the gum; the preparation of a poison from which is an exclusive art of the inhabitants at the eastern extremity of the island.

"In clearing new grounds near the tree, the inhabitants do not like to approach it, as they dread the cutaneous eruption which it is known to produce when newly cut down. But except when the trunk is extensively wounded, or when it is felled, by which a large portion of the juice is disengaged, the effluvium of which, mixing with the atmosphere, affects the persons exposed to it with the symptoms just mentioned, the tree may be approached and ascended like the common trees of the forest. Like all others in its neighbourhood, it is surrounded with shrubs and plants.

"One of the regents had caps or bonnets prepared from the inner bark, which were stiffened in the usual manner with rice-water, and handsomely painted, for the purpose of decorating his attendants; but they all refused to wear them, asserting that they would cause their hair to fall off.

"The following is a description of the mode of preparing this poison. About eight ounces of the juice from the tree, which had been collected during the preceding evening, and preserved in a joint of bamboo, was carefully strained in a bowl. The sap of the following substances, which had been finely grated and bruised, was then expressed, and poured into it, viz.—*Arum, Amomum, Common Onion,* and *Garlic,* of each about half a drachm; the same quantity of finely-powdered *Black Pepper* was then added, and the mixture stirred. A single seed of *Capsicum fruticosum* was then placed on the fluid, in the middle of the bowl: the seed began to reel round rapidly, now forming a regular circle, then darting towards the margin of the cup, with a perceptible commotion on the surface of the liquor, which continued for one minute. Being completely at rest, the same quantity of *Pepper* was again added, and another seed of the *Capsicum* laid on, as before; a similar commotion took place in the fluid, but in a less degree, and the seed was carried round with diminished rapidity. The addition of the same quantity of *Pepper* was made a third time, when a seed of the *Capsicum* being carefully placed in the centre of the fluid, it remained quiet, forming a regular circle in the fluid, resembling the halo of the moon. This is the sign that the preparation of the poison is complete."

Sir S. Raffles states that, "the common train of symptoms is a trembling of the extremities, restlessness, erection of the hair, affection of the bowels, drooping and faintness, slight spasms and convulsions, hasty breathing, an increased flow of saliva, spasmodic contractions of the pectoral and abdominal muscles, retching, vomiting, great agony, laborious respiration, violent and repeated convulsions, and death.

"The action of the *Upas* is chiefly directed to the vascular system. The volume of the blood is accumulated in a præternatural degree in the large vessels of the thorax.

"The circulation appears to be abstracted from the extremities and thrown upon the viscera near its source, the lungs being, in particular, stimulated to excessive exertions. The vital viscera are oppressed by an intolerable load, which produces the

symptoms above described, while in the extremities a proportionate degree of torpor takes place, accompanied by tremors, shiverings, and convulsions.

"The natives of Macassar, Borneo, and the Eastern Islands, when they employ this poison, make use of an arrow of bamboo, (to the end of which they attach a shark's tooth,) which they throw from a blow-tube or *sompit*

"The *Upas* appears to affect different quadrupeds with nearly equal force, proportionate in some degree to their size and disposition; and a man who was accidentally wounded by an arrow poisoned with it, in the elbow, died in half an hour with similar symptoms to those observed in animals."

LETTER FROM N. B. WARD, ESQ. TO DR. HOOKER, ON THE SUBJECT OF HIS IMPROVED METHOD OF TRANSPORTING LIVING PLANTS.

Wellclose Square, Jan. 13th, 1836.

MY DEAR SIR,

I HAVE lately heard that you wish for some information respecting my new method of growing plants without open exposure to air. As I do not intend to publish at present a detailed account, and as much misrepresentation exists upon the subject, I feel great pleasure in furnishing you with the principal facts, of which you may make any use you please.

The depressing influence of the air of large towns upon vegetation, had, for many years, engaged my attention.

The science of Botany, in consequence of the perusal of the works of the immortal Linnæus, had occupied me from my youth up, and the earliest object of my ambition was to possess an old wall, covered with ferns and mosses. Compelled by circumstances to live surrounded by, and enveloped in, the smoke of numerous manufactories, all my endeavours to keep my favourites alive, proved sooner or later unavailing. I was led, however, to reflect a little more deeply upon the subject, in consequence of a simple incident, which occurred about seven or eight years ago. I had buried the chrysalis of a Sphynx in some moist mould, which was contained in a wide-mouthed glass bottle, covered with a lid. In watching the bottle from day to day, I observed that the moisture which during the heat of the day arose from the mould, condensed on the internal surface of the glass, and returned from whence it came, thus keeping the mould always equally moist. About a week prior to the final change of the insect, a seedling Fern and Grass made their appearance upon the surface of the mould.

After I had secured my insect, I was anxious to watch the development of these plants in such a confined situation, and accordingly placed the bottle outside my study window. The plants continued to grow, and turned out to be the *Poa annua* and *Nephrodium Filix mas*. I now commenced a series of experiments upon other plants, principally Ferns, selecting those that were most difficult of culture, such as *Hymenophyllum*, &c. My method of proceeding was as follows:—Keeping nature always in view, I endeavoured to imitate the natural condition of the plants as much as possible, as regarded the exposure to light, solar heat, moisture, &c. Thus, if Ferns were the subject of experiment, they were planted in the mould most congenial to them, well watered, but all the superfluous water allowed to drain off, and then placed in a situation having a northern aspect. If, on the contrary, I wished to grow *Cacti*, they were planted in a mixture of loam and sand, suspended from the roof of the case, and fully exposed to solar heat. Upon this part of the subject I need not, however, dilate any further, and will therefore confine myself to the results obtained.

1st, That the depressing influence of the air of large towns upon vegetation depends almost entirely upon the fuliginous matter with which such an atmosphere is impregnated, and which produces the same effect upon the leaves of plants as upon the lungs of animals.

2ndly, That, owing to the quiet state of the atmosphere surrounding the plants in my inclosed cases, the plants, like human beings, will bear extremes of heat and of cold, which under ordinary circumstances would be fatal to them. It is well known, from the experiments of Sir C. Blagden, and others, that man will bear great degrees of heat with impunity, provided the atmosphere be undisturbed, and it is equally a matter of fact, that the extremest cold of the Arctic Regions produces no bad effect, when the air is quite still. Mr. King, who has recently returned from Capt. Back's Expedition, informed me that the greatest degree of cold he experienced was nearly 70° below zero; that no inconvenience was felt at that low temperature, owing to the perfectly calm state of the air; but that if the wind arose, although the thermometer would likewise rapidly rise with the wind, the cold then became insupportable.

These facts I have proved in the one case, by the exposure to sun of *Hymenophyllum* and *Trichomanes;* and in the other by growing without heat, *Aspidium molle*, *Phœnix dactylifera*, *Rhapis flabelliformis*, *Dendrobium pulchellum*, *Mammillaria tenuis*, &c. &c.

3rdly, That owing to the prevention of the escape of the moisture contained within the cases, plants will grow for many months, and even for years, without requiring fresh supplies of water. Thus, in the first experiment, the *Poa* and *Nephrodium* grew for four years, without one drop of water having been given to them during that period, and would, I believe, have grown as many more, had they not accidentally perished in consequence of the rusting of the tin lid covering the bottle, and the admission of rain-water.

4thly, That the degree of development to which the plants attain, depend mainly, *cæteris paribus*, upon the volume of air contained within the case, and upon the quantity of light and solar heat received by the plants. Thus to revert to the first experiment. The *Poa* and *Nephrodium*, being contained within a small bottle—the one flowered but once during its confinement, while the other did not produce any capsules. Both *Ferns* and *Grasses*, in my larger cases, flower and fruit well. *Phænogamous plants*, for instance, such as *Ipomæa Quamoclit* and *coccinea*, will not flower in a case exposed to the North, while in the same case, fully exposed to the South, these very plants come up from seed, and flower very well.

To sum up all, in every place where there is light, even in the centre of the most crowded and smoky cities, plants of almost every family may be grown, and particularly those which have heretofore been found the most difficult to cultivate. I have now, in a wide-mouthed bottle, simply and loosely covered with a tin lid, the following plants:—*Hymenophyllum Tunbridgense* and *Wilsoni*, *Trichomanes brevisetum*, *Hookeria lucens*, and other Mosses, *Jungermannia juniperina* and *reptans*, &c. &c. These plants have been inclosed for twelve months, and are growing most vigorously, although they have not once been watered during that period. In my other cases, the *Ferns*, *Palms*, *Orchideæ*, *Grasses*, many Monocotyledonous plants belonging to the families of *Scitamineæ*, *Bromeliaceæ*, &c. &c. grow very well; while, on the contrary, the continued humid state of the atmosphere is unfavourable to the development of the flowers of most of the *Exogenous plants*, excepting those which naturally grow in moist and shady situations, the *Linnæa borealis*, for instance, which I have had for more than two years, and which flowered twice last year in a situation where, without my protecting cases, the *London Pride* (*Saxifraga umbrosa*) ceases to exist after twelve or eighteen months.

This method will, I believe, assist the physiological Botanist in solving some points of great importance, connected with vegetation in general, such as the agency of various soils, the quantum of air necessary for the development of various tribes of plants, &c. &c.; and I shall be delighted in seeing the subject taken up by those who, with far greater knowledge than I possess, have likewise better opportunities

of prosecuting these interesting inquiries. Occupied, as I have unceasingly been for the last twenty years, with the harassing details of general medical practice, and living constantly in town, I find it impossible to do all that I wish, nor could I have gone on thus far, but for the unbounded liberality of Messrs. Loddiges, who from their ample stores, have most kindly furnished me with every plant I desired for the purposes of experiment.

I come now to the most important application of the above facts: that of the conveyance of plants upon long voyages. Reflecting upon the causes of the failure attending such conveyance, arising chiefly from deficiency or redundancy of water, from the spray of the sea, or from the want of light in protecting them from the spray, it was, of course, evident that my new method offered a ready means of obviating all these difficulties, and in the beginning of June, 1833, I filled two cases with Ferns, Grasses, &c., and sent them to Sydney under the care of my zealous friend, Captain Mallard, copies of whose letters I have enclosed.

The cases were refilled at Sydney, in the month of February, 1834, the thermometer then being between 90° and 100°. In their passage to England, they encountered very varying temperatures. The thermometer fell to 20° in rounding Cape Horn, and the decks were covered a foot deep with snow. In crossing the line the thermometer rose to 120°, and fell to 40° on their arrival in the British channel, in the beginning of November, eight months after they were enclosed. These plants were not once watered during their voyage, received no protection by day or by night, but were yet taken out at Loddiges' in the most healthy and vigorous condition. The plants chiefly consisted of Ferns, among them *Gleichenia microphylla* never before introduced alive, and the *Hymenophyllum Tunbridgense*. Several plants of *Callicoma serrata* had come up from seed during the voyage, and were in a very healthy state. As this experiment was made chiefly with *Ferns*, I will briefly give you an account of one other experiment, in which plants of a higher order of development were the subject of trial. Ibrahim Pacha being desirous to obtain useful and ornamental plants for his garden near Cairo, and at Damascus, commissioned his agents in this country to send them. I was requested by his agents to select them, and they were sent out in August, 1834, in the Nile Steamer, to Alexandria. They were about two months on their passage, and I have enclosed a copy of the letter from Mr. Traill, his gardener, giving an account of their condition when he received them; and have likewise sent you a list of the plants, which were contained in the Egyptian cases. I have, as yet, received no account of the Syrian plants. Various other trials have been made to other parts of the world, as Calcutta, Para, &c. &c., and with the same success.

I feel well assured that this method of importing plants would likewise be extremely useful in the introduction of many of the lower but most interesting tribes of animals, which have never yet been seen alive in this country.

In reply to an inquiry that was addressed to Mr. Ward, as to the adviseability of a collector's taking glazed boxes to Brazil, Mr. Ward thus writes. "I should imagine that these may be easily procured at Rio, and various other places; but if glass cannot be obtained, or is very dear, then a number of small panes might be carried, for use, as occasion requires.

"It may be as well to state, once for all, that the success of my plan is in exact proportion to the admission of light to all parts of the growing plants, and to the due regulation of the humidity of the mould wherein they grow. It is safer, in all instances, to give rather too little than too much water. If *Ferns*, for example, are the subject of experiment, they should be planted in the soil most congenial to them, well watered, but all the superfluous fluid allowed to drain off, before the case is finally closed; while on the other hand, succulent plants should be set in dry sand. I need not, however, dilate upon this, any

further than by observing that the natural condition of the species should be imitated, as far as possible, except in the free exposure to air. The *Cacti* travel best, when packed in fine and dry sand. All vegetable matters, used as package, are very injurious.

"You ask how the tropical *Orchideæ* may be best conveyed:—most certainly in the glazed cases: I believe, that, thus secured, ninety-five out of every hundred may be imported in a vigorous state from any part of the world, provided the voyage does not exceed eight or ten months in duration.

"In all instances, the plants require no attention during the voyage; the sole care requisite being to keep them in the light.

"You next enquire, what plan I would suggest, where glazed boxes are not procurable, and here I must give you higher authority than my own, that of Messrs. Loddiges, who find the means adopted by your American correspondent, the most eligible, viz., that of packing them in moderately moist *Sphagna*:—always excepting the succulent plants.

"Would it not be advisable to direct the attention of your collector, particularly, to the introduction of such plants as have never yet been seen alive in this country, owing to the impossibility of importing them in the old method? Every species of *Trichomanes* and *Hymenophyllum* might thus become inmates of our stoves, as well as a number of other interesting plants, which possess oily nuts or seeds, that quickly lose their germinating property, after they are ripe. These seeds might be sown in the mould among the other plants, and would come up during the voyage. All the *Palms*, the *Bertholletia*, &c., would succeed admirably in this way.

"I may remark, that there is one point, upon which misconception exists very generally, even among well informed men. Because my cases are made quite tight, it is imagined, that the plants contained in them receive no change of air. Now, it must be obvious to every one who reflects for an instant on the subject, that owing to the expansibility of the air by heat, there must, with every change of temperature, be a corresponding change in the volume of air contained within the cases. Without such a variation, the plants would, in all probability, soon perish."

N. B. WARD.

NEW SPECIES OF INDIAN BALSAMINEÆ.

By G. A. W. Arnott, Esq. A.M. F.R.S.E. &c. &c.

The following new species of *Balsamineæ*, are nearly all in the herbaria of Dr. Graham and Dr. Hooker, sent from Ceylon, and collected there by Col. and Mrs. Walker. In addition to these, Linnæus described, from Hermanns' herbarium, *I. cornuta*, which appears to be the wild form of *I. Balsamina*, *I. oppositifolia*, and *I. triflora*, which has now been referred to *Hydrocera* of Blume. De Candolle, describes *I. Leschenaltii*, and states that Leschenault found it in Ceylon, but the specimens given by that Botanist to Dr. Wallich, were from the Nielgherries in the peninsula of India. M. Macrae appears to have found, also, *I. scapigera*, on rocks near Kandy. Of these, there are common both to Ceylon and the Peninsula, only five, *Hydrocera triflora*, *Impatiens Balsamina*, *I. grandis*, *I. scapigera*, and *I. oppositifolia*; *Hydrocera triflora*, and *I. Balsamina* are found, also, elsewhere in India. There are thus, assuming the Peninsular species to have been all described by Dr. Wight and myself, (but I believe, that Dr. W. has discovered some additional new ones since his return to the East,) thirty-nine species known to both, of which sixteen are peculiar to Ceylon, and eighteen to the Peninsula, or rather, I ought to say, seventeen, because although *I. fasciculata* has not been found in Ceylon, it has been in Silhet. This is the more remarkable, since almost all those that occur in the Peninsula have been met with in the

mountainous districts in the South, and it might thence have been inferred that the Ceylonese species were the same: besides, several of those from Ceylon are so very similar to the species from the Peninsula, that at first sight they might have been supposed identical, but considerable differences are soon found to exist in the shape of the petals and spur. Thus, *I. rosmarinifolia* of Ceylon has quite the aspect of the narrow-leaved forms of *I. fasciculata*, but its spur is short, while in the other it is very long: *I. gibbosa* has the habit of *I. Leschenaultii*, but no spur; *I. appendiculata* that of *I. umbellata*, but also differing widely by the spur.

To the Ceylon species I have added a new one from the Peninsula, which appears to have been collected and mixed with *I. latifolia*, and consequently omitted in the Prodr. Fl. Penins. I have likewise altered slightly the character of *I. scabriuscula*, in consequence of a specimen I have seen in Sir W. J. Hooker's herbarium; and perhaps that of *I. Kleinii* ought to be also modified, as I have lately received specimens from Cannanore, on the Malabar coast, collected by Ensign Campbell, which differ slightly from those in Dr. Wallich's and Dr. Wight's collections, but not so much so perhaps as to enable them to rank as a distinct species.

In drawing up the following specific characters, I have still adopted the same language as in the Prodr. Fl. Penins., I. p. 135; that is, I have called the anterior *petalum* of Roeper (in the Linnæa, IX. p. 121, tab. 1.) a posterior sepal, and his *four lateral petals* two two-lobed ones: but it is but justice to my friend the Professor at Bâle, to confess that he has now so well elucidated his theory of the structure of the flowers of this family, which I certainly did not formerly understand in the way he intended, that it might be better at once to follow his views.

IMPATIENS. *Linn.*

§ *Foliis alternis, pedicellis axillaribus unifloris solitariis vel pluribus.*

1. I. *gibbosa* (Arn.); erecta ramosa glabra vel ad apicem pilis sulphureis nitentibus fragilibus adspersa, foliis breviter petiolatis alternis ovato-oblongis acuminatis basi cuneatis crenulato-serratis basi vel ad petioli apicem biglandulosis, pedicellis subbinis folium subæquantibus, sepalis lateralibus lanceolatis anteriore basi gibboso ecalcarato vel obscure apiculato duplo brevioribus, posteriore petala subæquante, petalis ad medium bifidis lobo anteriore obovali posteriore oblongo et paullum breviore, capsula sulphureo-pubescenti.—In Zeylanæ montibus.

Habitus fere I. *brevicornu*, cui maxime affinis, at foliis adultis longioribus, 2½—3 poll. longis, calcare capsulaque differt.

2. I. *brevicornu* (Arn.); erecta ramosa glabra, ramis herbaceis, foliis alternis petiolatis oblongo-ellipticis acuminatis basi integerrimis et cuneatim acuminatis sursum serratis, serraturis incurvis setuligeris, petiolis apice biglandulosis, pedicellis binis vel solitariis folio brevioribus, sepalis lateralibus oblongo-lanceolatis parvulis cæteris breviter cuspidatis, calcare arcuato conico acuto floribus multo breviore, capsulis (parvis) ovato-oblongis basi apice acuminatis glabris.—In Zeylana.

Species affinis *I. Leschenaultii*, at calcare perbrevi facile distinguenda. Folia subpollicaria.

3. I. *leptopoda* (Arn.); herbacea subramosa demum glabra, parte novella capsulaque pilis brevibus fragilibus nitidis sulphureis tectis, foliis ovato-lanceolatis acuminatis mucronato-serratis basi in petiolum eglandulosum cuneatim attenuatis, serraturis inferioribus glanduloso-setiferis, pedicellis subsolitariis gracilibus folio brevioribus, sepalis lateralibus alabastro dimidio brevioribus, cæteris petalis obcordato-bilobis brevioribus, calcare filiformi gracili pendulo flore explanato subduplo longiore, capsula oblonga utrinque attenuata.—In Zeylanæ montibus ad alt. 6000 ped.

4. I. *cuspidata* (Wight et Arn.); erecta glabra herbacea parce ramosa, foliis alternis longe petiolatis membranaceis oblongo-lanceolatis basi apice attenuatis

crenato-serratis, serraturis inferioribus petiolisque rariter setigeris, nervis subtus sparsim fulvo-pubescentibus, pedicellis solitariis binisve gracilibus folio subdimidio brevioribus fructiferis etiam erectis, sepalis lateralibus e basi brevi ovata longe subulatis anteriore rotundato subdimidio brevioribus, cæteris concavis apice longe subulato-cuspidatis, posteriore late ovali petala æquante, calcare filiformi flore explanato longiore apicem versus crassiore, petalorum lobo posteriore inconspicuo anteriore obovato, capsula oblongo-lanceolata basi apice attenuata glabra.—*Wight. cat. no.* 2242. In Peninsulæ australioribus I. O. montibus.

Species hæcce cum *I. latifolia* habitu satis conveniens revere est distinctissima ac propius *I. Leschenaultii* collocanda. Folia tres pollices longa vel paullo longiora. Exempla duo tantum vidi minimeque completa: petala videntur integra.

5. I. *bipartita* (Arn.); glabra herbacea, foliis alternis rigidulis breviuscule petiolatis anguste lanceolatis basi apice longe attenuatis crenato-serratis, serraturis inferioribus petiolisque rariter setigeris, nervis subtus glabris, pedicellis solitariis binisve foliorum fere longitudine, sepalis lateralibus longe lanceolato-subulatis anteriore brevioribus, posteriore suborbiculari petalis æquali dorso medio aculeato-cuspidato, anteriore subulato-cuspidato infundibuliformi in calcar filiforme flore explanato longius apicem versus crassius subiter contracto, petalis profunde bilobis, lobis oblongis obtusis anteriore paullo breviore augustioreque, fructu oblongo-lanceolato utrinque attenuato glabro. — In Zeylana, ad alt. 5000—6000 ped.

Nimis forsan affinis *I. cuspidatæ*, at folia augustiora crassiora nervis subtus glaberrimis, pedicelli longiores, flores paullum majores, et petala profunde bifida.

6. I. *flaccida* (Arn.); glabra herbacea, foliis alternis tenuiter membranaceis longe petiolatis elliptico-oblongis acuminatis basi in petiolum attenuatis crenato-serratis, petiolis parce glanduloso-setigeris, pedicellis solitariis binisve filiformibus folio brevioribus, sepalis lateralibus oblongo-lanceolatis anteriore plus duplo brevioribus posteriore petalis subæquali, calcare filiformi medio crassiore apice attenuato flore subduplo longiore, capsula elliptico-oblonga basi et apice attenuata glabra.—In Zeylana.

7. I. *Henslowiana* (Arn.); erecta, caule basi glabriusculo, foliis alternis suboppositisve membranaceis sparsim pilosis oblongo-lanceolatis basi apice attenuatis serratis, serraturis setigeris, pedicellis subbinis elongatis folium subæquantibus, sepalis lateralibus ovatis anterius æquantibus hirsutis, posteriore trilobo petalis paullo breviore, calcare subulato petalis subæquibilobis duplo longiore, capsula oblonga utrinque acuta articulatim pilosa.—In Zeylana ad alt. 6000 ped.

Affinis *I. latifoliæ* ob folia superiora subopposita, at revere *I. scabriusculæ*, a qua calcare mox distinguenda, propinquior.

8. I. *scabriuscula* (Heyne) erecta subramosa, caule superne hirto-pubescente, foliis alternis obovatis lanceolatisve basi in petiolum breviusculum pubescentem cuneatim attenuatis cuspidato serratis supra glabriusculis subtus parce pilosis, pedicellis binis pluribusve dense pubescentibus folio multo brevioribus, sepalis anteriore posterioreque dense ferrugineo-pubescentibus illo gibbo ecalcarato.—*Heyne in Roxb. fl. Ind.* (*ed. Wall.*) 2. *p.* 464; *Wight et Arn. Prod. fl. Pen. I. O.* 1. *p.* 136.—In Mysore? *Heyne.*

9. I. *glandulifera* (Arn.); caule erecto elato ramoso glabro, foliis alternis (adultis magnis) longe petiolatis ovali-lanceolatis acuminatis basi attenuatis argute et approximatim serratis subciliatis subtus ad nervos venasque parce breve-pilosis cæteroquin utrinque glabris, petiolo præcipue ad basin crebre glanduloso, pedicellis plurimis aggregatis petiolo adulto multo brevioribus, sepalis lateralibus auguste oblongis anteriore 3—4-plo longioribus cæteris petala superantibus apice cuspidato-acuminatis, anteriore late infundibuliformi in calcar incurvum

apice incrassatum sepalo duplo brevius subiter angustato, capsula oblonga demum glabriuscula.—In Zeylanæ ad alt. 4000 ped.

Species ab omnibus mihi cognitis distinctissima. Adsunt formæ duæ, nescio an sint varietates, an sint ex eadem radice: una, alabastro ovarioque fere glabriusculis; altera, alabastro ovarioque dense puberulis, flore explanato fructuque glabrescentibus.—" Caulis 10—12 pedalis. Folia adulta 16-pollicaria, petiolo 10-pollicari, juniora cum petiolo subtripollicaria, oblongo-lanceolata. Petioli, foliorum costa, pedunculique coccinei. Sepala coccinea, petala flava."—*D. Walker.*

§ 2. *Foliis alternis, pedunculis flores plures gerentibus.*

10. I. *appendiculata* (Arn.); herbacea pusilla simplex, foliis ad apicem caulis approximatis membranaceis longe petiolatis ovalibus vel ovali-lanceolatis supra pilis brevibus sparsis subtus glaberrimis parce crenatis serratisve, pedunculis elongatis apice racemum contractum subumbelliformem gerentibus, bracteis persistentibus, pedicellis filiformibus, sepalis lateralibus oblongis cæteris paullo brevioribus, posteriore basi gibboso petalis minore, anteriore calcarato, calcare flore multo breviore curvato inflato-tubuloso dein subiter angustato et summo apice incrassato, petalorum lobis anterioribus porrectis, capsula oblonga basi apice attenuata glabra.—α; foliis oblongo-lanceolatis acuminatis basi sensim attenuatis serratis, pedunculis folia superantibus.—β; foliis ovalibus obtusiusculis basi acutis crenatis, pedunculis folio brevioribus.—In Zeylanæ montibus.

Species quam maxime affinis I. *umbellatæ* Heynei, at calcare brevi mox distinguenda.

11. I. *subcordata* (Arn); erecta glabra, foliis longe petiolatis subcordato-ovatis crenato-serratis tenuiter membranaceis, petiolis eglandulosis, pedunculis axillaribus folio brevioribus apice subumbellatim plurifloris, pedicellis gracilibus, sepalis lateralibus oblongis acuminatis majusculis, posteriore petalis minore, calcare filiformi flore subduplo longiore, capsula ovata acuminata glabra.—In montibus Zeylanæ: (vidi tantummodo exemplum unicum, in herb. Hookeri, floribus exsiccatione ? albis).

12. I. *linearis* (Arn.); glaberrima, radice repente, foliis crassiusculis versus apicem caulis erecti humilis approximatis subsessilibus late linearibus apice acuminatis versus basin angustatis subtus pallidis distanter denticulato-serratis, pedunculis elongatis folia subæquantibus vel superantibus apice subumbellatim sub-5-floris, bracteis persistentibus ovato-lanceolatis apice subulatis, pedicellis filiformibus, sepalis lateralibus oblongo-lanceolatis anteriori calcarato subæqualibus, posteriore petalis breviore, calcare breviter inflato-tubuloso dein subiter angustato apice obtuso flore multo breviore, petal. lobo posteriore parvo anteriore magno obovato unguiculato, capsula ovata basi apice acuta glabra. In adscensu montis " Adam's Peak" Zeylanæ.

Species insignis, ad *I. acuminatam* Benth. in Wall. Cat. n. 4754, quodammodo accedens: affinis est etiam *I. fasciculatæ* quibusdam varietatibus ob folia et petalorum structuram. Caulis 4—10-pollicaris. Calcar fere omnino ut in *I. appendiculata.*

It is probable that *I. repens*, Moon's Cat. Ceyl. pl. p. 18, belongs to this; but as no characters are published, it is impossible to refer to any of his species with certainty.

13. I. *cornigera* (Arn.); erecta glaberrima, foliis alternis versus apicem caulis approximatis breviter petiolatis anguste oblongo-lanceolatis basi apice attenuatis crenato-serratis subtus plumbeis, petiolo eglanduloso, pedunculo foliis breviore apice racemum brevem gerente, bracteis ovalibus acutis persistentibus, pedicellis gracilibus, sepalis lateralibus ovatis brevibus, anteriore infundibuliformi in calcar apice sursum uncinatum sensim attenuato.—In adscensu montis " Adam's Peak" Zeylanæ.

Caulis pedalis. Flores albi, penduli, in exemplis suppetentibus vix explanati; at petala vix ultra sepalum anterius pro-

ducta videntur, dum ejus os sepalo posteriore fere clauditur; calcar, cum sepali parte infundibuliformi, flore duplo longius est, et 8—9 lineas longum.

The anterior sepal and spur bear, in miniature, an exact resemblance to a cow's horn.

14. I. *Hookeriana* (Arn.); erecta elata glabra, foliis alternis longe petiolatis ovalibus basi apice acutis acuminatisve crenato-serratis, petiolis apice biglandulosis, pedunculis folio paullo brevioribus apice pedicellos erectos filiformes 3—6 umbellatim gerentibus, bracteis deciduis, sepalis lateralibus oblongo-lanceolatis anteriore late conico mox in calcar subulatum flore duplo longius sursum circa florem incurvatum duplo brevioribus, posteriore petala subæquante, petalorum lobis late obovatis margine undulatis anteriore paullum longiore, capsula oblonga utrinque acuta glabra.—Circa Rambodde et Maturattee Zeylanæ, ad alt. 5000 ped.

Valde affinis sequenti, at flore paullum minore, sepalis lateralibus augustioribus, et anteriore in calcar duos poll. longum multo magis subiter augustatum, haud longe infundibuliforme. Petala sepalum anterius subtriplo superant. candida et sanguineo-guttata.

I have some hesitation whether *I. biglandulosa*, Moon's Cat. Ceyl. pl. p. 18, may not belong to this: the glands are very conspicuous, but it is more probable that he would have derived its name from the size of the flower.

15. I. *grandis* (Heyne); erecta elata glabra, foliis longe petiolatis ovatis ovalibusque acuminatis crenato-serratis, petiolis prope apicem biglandulosis, pedunculis folio brevioribus apice 2—4 pedicellos elongatos erectos umbellatos gerentibus, bracteis ovalibus acutis, sepalis lateralibus ovatis anteriore infundibuliformi sensim in calcar conico-subulatum pendulum medio sursum arcuatum attenuato triplo brevioribus.

The above character agrees with a specimen from the mountains of Ceylon, collected by Colonel Walker, as well as with those from Heyne's herbarium; but it is possible that differences exist in the structure of the petals, which can only be properly determined from living materials, or better dried specimens than I have yet seen: thus the Ceylon one appears to have the petals and posterior sepal nearly of a size, and the former curled on the margin as in *I. Hookeriana;* in Heyne's plant, the sepal appears considerably smaller than the petals, which in the dried state do not seem at all waved: in both, the petals are nearly equally two-lobed. In the Peninsular plant the glands are situated a little from the apex of the petiole: in the Ceylon one, at the apex, as in *I. Hookeriana.*

16. I. *Walkeri* (Hook. MSS.); erecta glabra subramosa, foliis longe petiolatis oblongo-lanceolatis basi apice attenuatis serratis, serraturis setigeris, petiolis eglandulosis, pedunculis versus caulis apicem axillaribus folia subæquantibus apice racemoso-plurifloris, racemo subcorymbiformi, bracteis persistentibus, pedicellis gracilibus elongatis erectis, sepalis lateralibus deltoideo-ovatis, anteriore adscendenti ventricoso-infundibuliformi in calcar conico-subulatum incurvum subiter attenuato ore contracto cum calcare petalis profunde bilobis subtriplo longiore, capsula glabra utrinque attenuata.—(Tab. XVIII.)—In sylvis inter Rambodda et Neuri-Ellia, Zeylanæ.

Flores coccinei, in siccis fulvo-aurantiaci, sepalis lateralibus viridibus.

17. I. *elongata* (Arn); simplex glabra, foliis longiuscule petiolatis oblongo vel ovato-lanceolatis basi apice acuminatis crassiusculis argute serratis subtus pallidis, petiolo eglanduloso, racemis longe pedunculatis elongatis multifloris laxis, bracteis subpersistentibus oblongo-lanceolatis reflexis, pedicellis filiformibus patentibus, sepalis lateralibus late ovatis acuminatis anteriore brevioribus, posteriore petalis subduplo minore, calcare filiformi sursum curvato, petalis subæque bilobis, capsula ovata acuminata glabra. In adscensu montis "Adam's Peak" Zeylanæ.

Racemi cum pedunculo 7-12 poll. longi, flores pallide rosei. Affinis quodammodo *I. insigni* D C., cui tamen

folia subsessilia glandulis binis substipitata, et caulis multo altior robustiorque.

Perhaps *I. serrata* of Moon's Cat. Ceyl. pl. p. 18, is the same as this; it was likewise found on Adam's Peak. When I compare this plant with *I. insignis,* I mean that described by De Candolle, and figured by Dr. Wallich in his Pl. As. Rar. II. t. 194, for there seems to be some confusion among the specimens distributed by the latter Botanist: that which both Sir W. J. Hooker and I received under n. 4766 (*I. insignis*) of his catalogue is totally distinct, and apparently *I. discolor,* D C.; while on the other hand *I. Jurpia,* Ham. Wall. Cat. n. 4761, is the true *I. insignis.*

18. I. *acaulis* (Arn.); glabra, foliis radicalibus petiolo elongato sublongioribus elliptico-ovatis obtusiusculis basi retusis crenato-serratis subtus pallidis, scapo foliis longiore apice racemoso-multifloro, bracteis persistentibus, pedicellis gracilibus solitariis patentibus secundis, sepalis lateralibus ovatis acuminatis, calcare adscendente gracili attenuato floribus explanatis 4—5-plo longioribus, petalorum lobo anteriore porrecto, capsula oblonga glabra.—In Zeylanæ montibus.

Ab *I. scapigera* Heynei, inter alia, foliorum forma facile distinguenda.

The root appears bulbous, so that this may be *I. bulbosa,* Moon. Cat. Ceyl. pl. p. 18, although Dr. Wight and I, in the Prod. Fl. Penins., were more disposed to refer that synonyme to *I. scapigera.*

§ 3. *Foliis oppositis, pedicellis axillaribus unifloris solitariis aut pluribus.*

19. I. *rosmarinifolia* (Retz): caule erecto simpliciusculo, foliis oppositis sessilibus crassiusculis (superioribus saltem) anguste linearibus apice attenuatis basi subcordatis spinuloso-serratis subtus pallidis, pedicellis solitariis binisve folio duplo brevioribus, sepalis lateralibus oblongo-lanceolatis cæteris subæqualibus, posteriore petalis triplo breviore, calcare conico incurvo sepalis subduplo breviore, petalorum lobo posteriore parvo anteriore oblongo longiuscule unguiculato, capsula glabra oblonga utrinque attenuata. *Retz, Obs.* 5. *p.* 29; *D C. Prod.* 1. *p.* 686.—In Zeylanæ montibus.

Facies omnino *I. fasciculata* Lam. (*I. heterophylla,* Wall.) formæ augustifoliæ, at flores multo minores et calcar breve.

On the specimens we have seen all the leaves are narrow-linear, while *I. rosmarinifolia* has been described with the lower ones broad and short; on this account I felt disposed to consider it distinct, and proposed the name *I. concinna,* but I am now satisfied that the leaves may vary as much here as in its ally above mentioned.

20. I. *Kleinii* (Wight et Arn.)—β?; foliis supra fere glabris, ex oblongis vel ellipticis et acutiusculis in obovata, majoribus quam in forma antehac descripta, pollicaribus, superioribus subsessilibus, prope basin utrinque glandulis 1—2 magnis instructis.—Ad Cannanore; *D. Campbell.*

BOTANICAL INFORMATION.

ALGÆ DANMONIENSES.

By some untoward circumstances, our 3rd vol. of the beautiful "*Algæ Danmonienses,* or dried specimens of Marine Plants, principally collected in Devonshire, by Mary Wyatt," has only at length reached us, and we hasten to lay before the public a brief notice of its contents, which are no less interesting than those of the preceding Numbers. No. 101. *Cystoseira granulata.* 102. *Fucus canaliculatus.* 103. *Fucus tuberculatus.* 104. *Sporochnus pedunculatus.* 105. *Sporochnus villosus.* 106. *Furcellaria fastigiata.* 107. *Nitophyllum laceratum.* 108. *Rhodomenia polycarpa.* 109. *Rhodomenia Palmetta.* 110. *Rhodomenia palmata.* 111. *Rhodomenia subfusca.* 112. *Rhodomela pinastroides.* 113. *Laurencia pinnatifida.* 114. *Chylocladia ovalis.* 115. *Gigartina erecta.* 116. *Gigartina plicata.* 117. *Chondrus mammillosus.* 118. *Chondrus crispus.* 119. *Chondrus crispus,* narrow *var.* 120. *Chondrus Norvegicus.* 121. *Chondrus Brodiaei,* var. B. 122. *Sphærococcus coronopifolius.* 123. *Grateloupia filicina.* 124. *Chætophora Wiggii.*

125. *Halymenia ligulata.* 126. *Catenella Opuntia.* 127. *Codium adhærens,* Ag. (Hook. Journ. of Bot. p. 305; a recent addition to our Flora made by Mrs. Griffiths, but it is of very rare occurrence). 128. *Bryopsis plumosa.* 129. *Ectocarpus littoralis.* 130. *Ectocarpus Mertensii* (extremely rare). 131. *Myrsotrichia clavæformis,* (Harv. in Hook. Journal of Bot. p. 300, tab. 138, a late discovery of Mrs. Griffiths, at Torquay). 132. *Polysiphonia fruticulosa.* 133. *Polysiphonia urceolata.* 134. *Polysiphonia Agardhiana.* 135. *Polysiphonia nigrescens.* 136. *Polysiphonia fibrillosa.* 137. *Griffithsia setacea.* 138. *Calithamnion Plumula.* 139. *Calithamnion lanosum.* 140. *Calithamnion polyspermum.* 141. *Calithamnion tetricum.* 142. *Conferva implexa.* 143. *Conferva glomerata.* 144. *Conferva diffusa.* 145. *Conferva rectangularis.* 146. *Conferva uncialis* (Harv. in Hook. Journal of Bot. p. 304); lately discovered by Mrs. Griffiths, at Torquay). 147. *Lyngbya majuscula.* 148. *Mesogloia coccinea* (very rare). 149. *Corynephora marina.* 150. *Schizonema comoides.* 151. *Schizonema Smithii.*

Many persons who take an interest in this charming publication, having expressed a desire to possess a "*Manual of the British Marine Algæ,*" it is our intention to prepare such a work shortly, and we should be thankful to receive specimens of new or rare species from any part of our coasts, as well as information respecting unpublished localities of the scarce kinds. The descriptions will be written entirely in English, and all unnecessary *technical* terms will be avoided.—Ed.

Our valued friend, Mr. Edward Forster, thus writes to us:—"My dear Sir, Knowing your readiness to correct errors, I trouble you with the following two observations, which are at your service if you like to make use of them for the "Companion to the Botanical Magazine."

In your British Flora, ed. 3. p. 206, you appear to be under an impression that *Silene patens,* E. Bot. Suppl. 2748 *(Silene Italica)* is identical with *Silene nutans, β.* Sm. Engl. Flora; a statement which originates probably in a remark among the Errata and observations at the end of the Supplement, "There is in Mr. Sowerby's Herbarium a specimen of *Silene patens* gathered at Dover by Edward Forster Esq., in 1822." Well assured that I had only found there *Silene nutans,* with the leaves broader than on the Nottingham plant, I was much surprised at this statement, and immediately requested our friend Mr. J. D. C. Sowerby, to permit me to examine the specimen alluded to. On inspection, the coronary appendages to the petals, always absent in *S. Italica,* appear visible; nor are the germens sitting on an elevated column. These characters sufficiently prove that it is only the variety of *S. nutans,* mistaken by Hudson for *Cucubalus viscosus,* (Lychnis major noctiflora Dubrensis perennis, Newton in Raii Syn. ed. 2. 211), and by no means *S. Italica,* the British authority for which rests solely on Mr. Peete, who asserts that the specimen in his garden, from which the drawing was made for the Supplement, was introduced by himself from Dover, where he gathered it, in 1825. The reference to Hudson ought to have been omitted.

Lunularia cruciata, which is become a most destructive weed in garden pots in the neighbourhood of London, I found truly indigenous many years since, in great abundance on Sand Cliff, between Boxhill and Betchworth, Surry, as well as on rocks at East Grimstead, Sussex. I suspect it is not rare. It will be well figured with Dr. Taylor's paper on *Marchantiæ,* in the next Part of the Linnæan Transactions."

SOME ACCOUNT OF A BOTANICAL EXCURSION, MADE IN THE NEIGHBOURHOOD OF COURTALLAM, AND IN THE ADJACENT MOUNTAINS.

By Robert Wight, M.D. F.L.S.

Communicated in a letter to Dr. Greville.

The indefatigable exertions and literary labours of three of the most intelligent Bo-

tanists of our day, Dr. Wallich, Dr. Wight, and Mr. Royle, in furthering the course of Indian Botany, have thrown a new light upon the Natural History of our widely-extended Asiatic possessions, and have been the means of making known a vast quantity of useful plants, which cannot fail to be of the greatest importance to the world in general, and to the East India Company in particular.

Each of the above-mentioned gentlemen has been placed under circumstances in India, the best calculated for the purpose of exploring a wide extent of country. To Dr. Wight has been assigned, as it were, the vast southern Peninsula of India; to Dr. Wallich, Hindostan, Sylhet, &c., while his extended journies to the Himalaya Mountains, and his present one to Assam with the view of establishing the cultivation of the Tea-plant, embrace such a field as no one before him ever had the privilege of exploring; and to Mr. Royle, the northern and most mountainous provinces of India, or indeed of the whole world, with the vegetation of which he is now making us familiar. Dr. Wight, after completing, in conjunction with his friend Mr. Arnott, the first volume of the Flora of the Peninsula of British *India*, has returned to that country, and is now (1836) stationed at Palamcottah of Tinevelly, in the south of the Peninsula. The visit to Courtallam, here described by him, was a professional one, which necessarily prevented him from devoting his whole time to the Botanical investigation of the district.—Ed.

Courtallam, or Kootallum, as it is usually pronounced, is a very inconsiderable village, situated in N. Lat. 9°, and E. Long. 77° 26′, near the foot of the range of mountains which traverses the Peninsula from North to South. At this part, the range seems to retire towards the West, forming, as it were, a small recess surrounded on three sides by hills, which near Courtallam undergo a considerable diminution in their height, and are, besides, divided by a deep but narrow pass, leading directly across to the Malabar coast. Owing to this break, and diminution in height, part of the western monsoon passes over in the form of thick clouds, frequent showers of rain, and very strong westerly winds. The united influence of these causes reduces the temperature of this spot from 10 to 15 degrees below that of the surrounding country. This of itself would be sufficient to attract visitors during the hot months of June, July, and August; but there are other inducements of a not less enticing description. There all is green and lively, when the plain below is burnt up, and scarcely a blade of grass to be seen; the scenery is rich and varied, and enlivened by a series of beautiful cascades, the fall of the lowest of which, though 200 feet in height, is so broken in the descent as to be a favorite bathing place, where the visitors enjoy a shower-bath on the most magnificent scale. The surrounding scenery is, I think, the richest I have anywhere seen in India. You are aware that I am no painter; you must not therefore be disappointed if I fail in presenting to your mind's eye such a landscape as now offers itself to mine. I shall, however, with the aid of Geology, make the attempt. The hills here are all trap, presenting the characteristic features of that class of rocks, such as sharp broken ridges, high peaks, and nearly perpendicular sides, traversed by deep ravines and chasms, down which the mountain streams tumble with noisy impetuosity. The shelving and less steep flanks of these hills are covered with a loose, red, and very fertile soil, formed partly of disintegrated rock, partly of decayed vegetable matter. These shelves and slopes are densely clothed with a vegetation highly varied, and of truly tropical luxuriance, the whole presenting to the view a mixture of delicate verdure, dark forests, and black, almost perpendicular, naked cliffs, forming together, a rare combination of beauty and grandeur. The narrow glen along which the principal stream pursues its rapid course, looks almost as if excavated from the solid rocks, as its sides, at some places, are close to the water's edge and nearly perpendicular;

at others, however, they open into small amphitheatres covered with deep and very fertile soil. On these favoured spots, are cultivated some of the most esteemed vegetable products of the East, such as *Cinnamon, Nutmegs, Coffee, &c.;* the two last are of excellent quality and in considerable quantity. The woods on either side which shelter these gardens are generally composed of fine large trees, mixed with numerous smaller ones, bound together by a profusion of twining shrubs. Under the shade grow a great variety of *Scitamineæ,* among which, *Cardamoms, Arrow-root, Ginger,* and *Turmeric* may be mentioned, several species of *Pepper,* and three or four of *Peperomia;* some curious *Urticeous* plants, a species of *Dorstenia,* four or five *Begonias,* that very curious plant *Bragantia* (or *Trimereza*), many *Orchideæ, Asphodeleæ, Aroideæ,* and Ferns in great profusion. Among the trees I found several *Annonaceæ,* a large arboreous *Phoberos,* several arborescent *Leguminosæ,* a number of *Rubiaceæ,* one of the most interesting of which I considered the *Morinda umbellata,* climbing, as it does, to the tops of the highest trees. Two species of *Myristica* I was enabled to distinguish by the mace only, the trees being so large that I could not obtain specimens. *Menispermaceæ* abound. Here I saw for the first time, *Cocculus macrocarpus,* a powerful twiner. The stems and larger branches are at this season covered with loads of fruit, hanging in large clusters, vying with grapes in size, and most enticing to look at, being covered with a fine white bloom. I also found what appears to me a new species of *Clypea,* the male plant only; the flowers are collected into flat dense heads, somewhat resembling a *Dorstenia,* hence the temporary name I have given it, until the discovery of the female flowers shall determine whether it is new or not.

I have no room to say more concerning the inexhaustible treasures of this matchless glen, for if I do, I fear there will be little space left for an account of the excursion to "Botany Peak," the main object of my letter, and were I to fill three other sheets in expatiating on its Flora, I should still fall short in adequately pourtraying its merits as a botanical garden, for such I consider its most appropriate designation.

The hill occupying the south-east point of the recess of Courtallam is the loftiest of this part of the range, the highest peak of which, my companions humorously designated, in honour of the collections of the day, Botany Peak. It is distant about three miles from the houses of the Europeans. About six, A.M. we left home, and rode to the foot of it. At seven we commenced the ascent, carrying a barometer, provisions for the day, two large botanical boxes, and sundry quires of paper. The Europeans, three in number, were armed with double-barrelled fowling pieces loaded with ball, in case of accidents, as it was rumoured that there was an elephant in the way. This we did not believe, but were afterwards convinced of the truth of the report, by seeing his foot-marks, though not the animal himself. About nine we arrived on the bank of a small stream, half way up; and this being the only one we had to cross in the ascent, we stopped and breakfasted. There I found several plants new to me, and saw growing for the first time the *Rhus decipiens.* It is a tall handsome tree: one I measured was nearly 40 feet long; it had been blown down, but not so as to stop its growth, and was not at this time in flower. The Plantain was also growing wild, along with a species of *Maranta.* I likewise found a Labiate plant, apparently of the genus *Lamium.* A few other plants were picked up at this place, and added to a considerable number gathered in the previous ascent. Having refreshed and rested ourselves, we pushed on with all possible speed, to leave ourselves more time to accomplish the steeper and more difficult part of the ascent which was still before us. For nearly a quarter of a mile from the stream, we passed over a piece of cleared land, where some of the commoner *cerealia* are cultivated, and which at this time was covered with *Paspalum frumentaceum;* among which I found two species of *Torenia, T. Asiatica,* and another very handsome, large-flowered

species; also a magnificent *Lobelia,* apparently intermediate between *L. nicotianæfolia,* and *L. excelsa,* but not in a good state for preservation. On leaving this green spot, we entered a deep and dark wood, forming a belt of uncertain length, but nearly a mile in breadth, composed of a great variety of stately trees, mixed with many smaller ones, and under-shrubs of every description. Among the herbaceous plants, growing under the shade, is the *Cardamom* and several other species of *Scitamineæ,* a great variety of *Arums,* some of them very handsome, two or three species of *Didymocarpeæ,* and many highly curious *Orchideæ,* one of which grows like a moss on the moist rocks, a shrubby *Chloranthus* in great abundance, and several Ferns. The trees I am not so well prepared to specify, as they were difficult to get at, and required more time than could be spared; but I obtained specimens of one or two *Annonaceæ,* and of a variety of shrubby as well as herbaceous *Rubiaceæ.* I picked up one or two of the fruit of a very large *Nutmeg-tree,* much resembling (in fruit) the aromatic nutmeg, both in size and in the kind of mace which covers the nut. To have got specimens of the tree, we must have cut it down, which would have been a week's work. I protracted my stay in this forest to the utmost, both in ascending and descending, and then left it with regret, wishing that I could have devoted a month to the examination of the plants growing on this spot, and satisfied that I should still have left much for future investigators. On quitting the forest, the hill became very steep, and so thickly covered with bamboos, that we had the greatest difficulty in making our way through them, though much more pliable and innocuous than those of the plain. About twelve, we reached the first halting place, familiarly known by the name of Hatfield's Peak, from a gentleman of that name who had formerly visited it. Here we rested; set up the barometer, which indicated a height of about 3,600 feet above the sea, and made some rough trigonometrical experiments to determine the heights of neighbouring peaks. In the mean time I occupied myself in examining the Flora, and was fortunate in adding a few good plants to my collections, among the most interesting of which was one agreeing in habit with *Crassula,* but differing in the flower; a Euphorbiaceous shrub, apparently a new genus; a most beautiful *Phillyrea?* but not in fruit; and an *Acacia?* certainly new to me, but neither in flower nor fruit. At this height, we met with many young plants of *Caryota urens,* but none of considerable size, which surprised me. Here the *Bentinckia* abounds, setting at defiance the almost hurricane blasts that sweep the hills at this season, rising above all the plants by which it is surrounded, and producing and ripening its panicles of shining, black, desirable-looking, but most austere berries, in as great profusion as in the most sheltered valley. The Euphorbiaceous plant is characterized by a large 5-parted *calyx,* 5 minute *petals,* attached to the inner edge of a large cup-shaped *torus. Male flowers; stamens* 5, the *filaments* embracing a sterile 3-cleft *style: Female flowers; stamens* 0, *styles* 3, the *stigmas* 2-cleft, *ovary* closely embraced at the base by the *torus,* 3-celled, with 2 pendulous *ovules* in each, without the interposition of a *carunculus* as in *Savia?* It is a small shrub with alternate leaves and flowers on a rather long thick peduncle, like those of *Erythroxylon.* Should an examination of the fruit prove this to be a new genus, I propose calling it *Macroclinia* on account of its peculiar torus. On the most exposed part of a narrow ridge leading to Hatfield's Peak, we came upon the lair of a wild hog. It resembled a hay stack in miniature, made up of tufts of grass heaped one above another, and apparently brought from some distance, as there was no marks of the grass being dug round the place. These tufts were so nicely adjusted as to bid defiance to the wind, which for months at this season blows almost a hurricane at this place. It was not however proof against the ruthless hands of man, for it was speedily broken into in search of pigs; but none were found. Leaving two of my

collectors, under the shelter of some bushes, to transfer the plants collected from the boxes to paper, we pushed on to our final destination, the highest point of the mountain, which we reached a little after one o'clock, and ascertained the elevation by barometrical measurement to be 4,350 feet above the level of the sea. This was by far the most difficult part of the ascent, on account of its steepness, the broken character of the ground, and the closeness of the bamboos. We found ourselves enveloped in clouds and mist, although a bright sun was shining below. The thermometer fell from 75 degrees, the usual height on the plain, to 60: the barometer to 25.800. The few trees that are scattered about here, are stunted in their growth and enveloped in a thick coating of lichens. Had time permitted, and locomotion been easier, I should have tried to ascertain what they were; but the bamboos were so close that we were obliged to cut our way, and to clear a spot in order to set up the barometer. The bamboos had undergone a similar change to the trees, for in place of fine, tall, tapering plants, not unlike clumsy fishing-rods, they had acquired the appearance and name of reeds. A species of *Oxalis* is very abundant among them, but whether an alpine variety of O. *sensitiva*, or a distinct species, remains to be determined. It differs greatly in habit, in having a long branched stem, each branch being terminated by a tuft of leaves and flowers, like those of O. *sensitiva*, but it is less sensitive, which may be owing to the lower temperature of its place of growth. The Bamboo among which it grows is peculiar and so far as I have been able to discover, a nondescript species, which, however, I cannot adequately describe, for want of the parts of fructification. It is a tall, straight, nearly branchless, reed-like plant, attaining in sheltered situations a height of between twenty and thirty feet, with a slender, smooth, hollow stem, very firm and ligneous below; the leaves lanceolate, sheathing, confined to the extremities of the shoots, and furnished with a short but distinct petiole: in size these leaves greatly exceed those of all the other bamboos I have seen in this country, the larger ones being from eight to ten inches long and from two to three broad, tapering at both ends. Altogether they are so like those used by the Chinese in packing tea, except in being less coriaceous, that I am inclined to consider our plant, if not identical, a very nearly allied species, perhaps a variety, the difference depending on situation.

Having at length accomplished the main object of our journey, we commenced the descent; the first part of which was performed as rapidly as the close growth of the Bamboos, or Reeds, as they are usually called, and the broken nature of the ground, would permit. Although much botanizing was out of the question, I got a few plants which I had overlooked in the ascent; but upon re-entering the forest, I took the liberty of dropping behind my companions, who were not botanists, and enjoyed such an hour's herborising as rarely falls to the lot of even the most enthusiastic individuals; to the dismay however of my friends, who at length fancying that I had lost my way or been attacked by wild beasts, or a score of other things all equally near the truth, set up such a shouting as to leave me no alternative but to rejoin them, which I did with great regret: I had however again filled my boxes and formed a large parcel besides. I could not but lament my inability to spend several days in that noble forest, and not at one season, but every season in the year, if the climate would permit it. To go there for one day only, is extremely tantalizing, as one is lost and perplexed by the endless variety of forms at once presented to the eye. From the time of our leaving the wood the descent was so very rapid, that we had all remounted our horses before five o'clock, and in little more than half an hour were enjoying ourselves in the shower bath.

I must now endeavour to give you some idea of the richness of the Flora of these hills, deduced from the observations of this excursion only, as it would take up too much time to go over my herbarium to

arrive at a more satisfactory result. My visit to Courtallam was a professional one, and extended to eight days only; those of my arrival and departure included. In that time I made five excursions, none exceeding one fourth of the distance of that which I have above described, and returned to Palamcottah with species belonging to about eighty Natural Orders, exclusive of about fifty species still undetermined, and of a great number of plants lost in the drying from having run short of paper. The number of species of which I have actually got specimens, considerably exceeds three hundred; I cannot say how many were lost. Besides these, no specimens were gathered of a large proportion of the high trees, which we had time neither to cut down nor climb; but several of them were ascertained from the fallen fruit to be new. The more common plants, of which I already possessed specimens, or could easily obtain at any other time, were altogether rejected, making a total of probably not fewer than five hundred species seen in flower or fruit, in the short space of five days, and at a rather unfavourable season of the year. These numbers afford data, from which I think we may safely infer, that a very small portion of these hills, say twenty miles square, possesses a Flora of probably little short of fifteen hundred species of vascular plants, including Ferns in the wider sense of the term; and if the field be extended to the higher hills to the North and South-west, I have no doubt that five hundred more may be added. I say five hundred, for the hills alluded to rise more than fifteen hundred feet above the one we ascended; a height at which an almost new Flora presents itself. If there is any truth in this calculation, it follows that on this mere speck of ground, there is a Flora exceeding the phœnogamous Flora of the whole of the British Islands, and nearly equalling in amount the number of species described in Roxburgh's *Flora Indica*. Surely, if ever a country deserved the scrutinizing search of an able and diligent Botanist, it is this. So satisfied am I on this point, that I have now three native collectors employed here. It is true, I do not expect much from their exertions, as natives are always timid explorers of the jungle, unless led by an European, when they will cheerfully follow; but, as the field in itself is one of the richest I know, I send them to it, as one from which I have the best chance of procuring valuable additions to my already extensive collections, and one which my other occupations do not permit me to investigate by my own exertions.

As this letter greatly exceeds its anticipated limits, I must conclude with the hope that my unfavorable expectations respecting the success of my collectors, may not be realized.

I remain, &c.

P. S. 4th September, 1835.

There being no ships about to sail when I finished the preceding communication, I kept it open, in case anything additional should occur to be added. And it so happened, that my services being required a second time at Courtallam, I availed myself of the opportunity to make several excursions, by which I have nearly doubled my collections, and added a great many new plants. Among them may be mentioned several *Annonaceæ,* five or six handsome *Balsams,* one so very curious and distinct, that I propose to constitute it a new genus, under some such name as *Koryanthus,* in allusion to the helmet formed by the two upper sepals. Two or three very remarkable *Melastomaceæ* will form, I believe, a novel and very distinct genus. I have also a very fine new *Ceropegia;* two undescribed species of *Didymocarpeæ,* one of them I think, constituting a distinct genus, allied to the *Wulfenia* of Wallich's *Tent. Fl. Nepal.;* a great variety of *Orchideæ;* a number of *Aroideæ,* among which is an enormous *Pothos,* and two or three genera quite new to me. Of the *Bamboo,* I found flowering specimens, but not in a very good state, and several *Carices* which I have not seen before; and

lastly, a very curious species of *Phallus*, decorated with a wide loosely pendulous net hanging from the inside of the hood, reaching to the ground and covering the stem like a veil, (*P. Dæmonum, Hook. Bot. of Beech. Voy. v.* 1. *p.* 78. 120.) The result of this second excursion more than confirms my previous calculation of the riches of these hills, in distinct vegetable forms. I am now disposed to think that two thousand species may be found within the limits assigned above to fifteen hundred. I have come to this conclusion, from having extended my excursion on one occasion to a more distant part of the hills, and found many more new plants than on any former day. Hitherto, I had explored only the northern slopes; but on this last occasion I examined the southern side, and certainly paid for my temerity by having to stay in the jungle all night, having gone too far and lost my way in returning home. I was, however, well repaid for my privations by an unusually large harvest of good things. The hills here are not like those of Clova, for you can rarely see a hundred yards before you, on account of jungle. I have re-examined the *Macroclinia*, and suspect it is too closely allied to *Savia* to be separated; differing only in having the filaments united into a tube the whole length of the styles, and in the want of the fleshy mass to which, in *Savia*, the ovules are attached.—R. W.

VEGETATION OF THE CANARY ISLANDS.

WE promised, in a late number of this journal, to offer to our readers some extracts from the early Livraisons of Messrs. Webb and Berthelot's Natural History of the Canary Isles. We now redeem that pledge, and we think we cannot present a fairer specimen of the work nor a more instructive portion than the very first Chapter.

ON THE GENERAL ASPECT OF VEGETATION IN THE CANARY ISLANDS.

"I have seen Nature in many parts of the Torrid Zone wearing a more rich and majestic aspect than here; but after having surveyed the shores of the Oronoco, the Cordilleras of Peru, and the lovely vallies of Mexico, I must declare that I never beheld a view which could be considered more attractive, more varied and more harmonious, owing to the distribution of its masses of verdure and its rocks."—*Humboldt.*

THE Canary Islands, from their proximity to the Tropics, are situated in the most favored latitude possible, as regards vegetation: their climate partaking both of the energy of the Torrid and the freshness of the Temperate Zones. The heat of the sun is combined with the most active principles to fertilize a soil which would otherwise have been condemned, by volcanic agency, to utter sterility; peculiar circumstances call new germs into existence, and the virgin soil having first produced a peculiar Flora, is afterwards endowed, by the influences of climate, with the plants of both hemispheres, that become naturalized there. Those aboriginal species which grow spontaneously in these Atlantic Islands belong mostly to European genera, but they are of longer duration, and are more woody, frequently even arborescent. There are some others, also, which wear other forms and a different aspect; many being single types of genera to which there is nothing analogous, as *Visnea, Phyllis, Bosea, Drusa, Plocama, Canarina,* &c.; while others, again, constitute groupes of species, distinguished by a general resemblance and a remarkable character, as the *Semperviva, Bystropogons, Echiums,* &c. Among these varied vegetables, some are marked with an African character, while others, though fewer in number, exhibit some resemblance to the productions of America; the larger *Euphorbias,* the *Palms,* the *Zygophylla, Aizoons,* and *Kleinias* belonging to the former class, and the *Laurels, Ardisias, Bœhmerias, Drusa,* and several kinds of *Ferns,* to the latter. Thus the Flora of the Canaries seems to prove the migration of the plants from our

temperate countries to intratropical regions; and whether we consider the number of local species, the novelty of their forms, or the singularity of their appearance, characters that belong to the great mass of prevailing plants, it must be confessed that in all these respects the Botany of the Archipelago of the Canaries well merits the title of a *Region*. The different stations occupied by these vegetables, the sort of sociability which seems to unite some, with the solitariness that others affect, are so many considerations that give interest to research, when after having examined the several groupes in detail, we would pass on to the order of their distribution. "The Floras of Islands," as is well remarked by the illustrious Genevese Professor, De Candolle, "possess an eminent degree of interest, both by the peculiarities that they present and because the task being of a limited extent, it can be performed with the greater precision." The truth of this observation has been impressed upon our minds when investigating the Canaries, where we have been enabled to ascertain many points during our partial excursions which would have certainly escaped us on a continent, the greater space rendering such results impossible to be obtained.

The disparities existing in the vegetable distribution of each island, and arising from accidental circumstances of soil, exposure and temperature, have multiplied the contrasts and produced remarkable changes in the Geographical arrangement. From these differences have resulted almost as many distinct Floras as there are islands, each possessing some species peculiar to itself, while the mass of plants on each, though consisting of such individuals as may be common to all parts of the Archipelago, never exists in similar proportions. Thus, for instance, Alegranza, Montaña-Clara, Graciosa and the other desert islets situated to the North of Lancerotta, abound in species of *Chenopodium* and *Polycarpæa*, mingled with several other plants of the maritime region. When landing on these insulated rocks, nothing appears which may call to mind the vegetation of the other islands; the *Euphorbia* of the Canaries, and its congeners, the *Plocama*, *Kleinias* and *Prenanthes*, being replaced by large bushes of *Atriplex*, *Salicornia*, *Suæda* and *Salsola*, with other alkaline plants growing under their shadow.

The plants that we gathered on the Islet of Graciosa, on the 5th of June 1829, are given in a list at the end of this chapter, arranged according to their degree of frequency. This miniature Flora, consisting of twenty-nine species, presents the following peculiarities. There are 7 *Chenopodeæ*, 5 *Leguminosæ*, 3 *Plumbagineæ*, 2 *Polycarpeæ*, 2 *Plantagineæ*; of *Liliaceæ*, *Gramineæ*, *Euphorbiaceæ*, *Boragineæ*, *Caryophylleæ*, *Compositæ*, *Geraniaceæ*, *Cistineæ*, and *Frankeniaceæ*, *one* of each.

The *Atriplex Halimus*, a large-leaved variety, not seen on the other islands; *Salicornia fruticosa*, found also on the coast of Lancerotta, opposite Graciosa; *Atriplex glauca*, *Salsola vermiculata* and *Suæda fruticosa*, all much more numerous on this islet than in the rest of the Archipelago, compose the chief vegetation of this rock.

Statice pruimosa, first found by M. Delille in Egypt, grows also at Alegranza, *Statice puberula* (nob.), *Reseda chrystallina* (nob.), *Ononis ochreata* (nob.), and *Ononis pendula*, are four extremely rare species, which we saw nowhere else than in a single spot of the island Lancerotta, while *Ononis hebecarpa* (nob.) is quite confined to Graciosa.

Finally, a single kind of *Euphorbia* (*E. piscatoria*) very frequent on the other islands, grows on this rock, almost concealed by the *Chenopodia*. Thus in twenty-six species, from ten to twelve are quite peculiar to this locality, while the others, though common to the rest of the groupe, display themselves in a different proportion. The species are mostly herbaceous and creep among the more woody kinds.

Now, if we bear in mind the number of peculiar species and the disparity that exists in their numerical proportion from that of the other islands, we may easily perceive that vegetation must bear a different aspect

in Graciosa, since the plants that most abound in *them*, are altogether wanting here.

At Lancerotta and Fortaventura, vegetation begins to extend on a larger scale; sandy districts and vast plains call to mind the Saharas of Western Africa, and some of those plants which grow on the edge of the desert; the shifting of the soil is very frequent, and the species that are seen in the rest of the Archipelago, grow in the vallies and the intersecting ravines. The *Euphorbias* are numerous and with them the *Compositæ* and shrubby *Convolvulaceæ*, *Conyza sericea*, *Prenanthes pinnata* and *P. arborea*, *Convolvulus floridus* and *C. scoparius*. Some stunted Heath, *Erica arborea* and *Myrica Faya*, hidden in the sinuosities of the mountains, or buffeted by the winds on their barren summits, recall that ever-green region that forms the chief decoration of the loftier islands of that groupe. Still, notwithstanding these generalities, Lancerotta and Fortaventura possess likewise their peculiar plants, and three kinds of trees, *Palm*, *Pistachio*, and *Tamarisk*, are much more numerous on these islands than the others. At Lancerotta the *Date Palms (Phœnix dactylifera)* abound in the district of Haria; at Fortaventura, this species, mingled with *Pistachio* Trees *(Pistacia Atlantica)* fringes the narrow valley of Rio Palma, one of the most remarkable spots in the Canaries, and which still preserves all its originality. The *Tamarisk* (*Tamarix Canariensis)* clothes the swampy plains of Grand-Tarajal, and is also seen on the coast of the Greater Canary, in the vicinity of Maspaloma; these shrubs there finding a similar soil, with an analogous exposure and temperature, and where sheltered by the denes they increase on the edges of the lagoons.

Among the peculiar species, the following are confined to Lancerotta and Fortaventura: *Ruta bracteosa*, *Arenaria procumbens* (Vahl), *Linaria heterophylla*, (Schousb.) *Sonchus divaricatus*, *Reseda subulata*, and *R. chrystallina* (nob.), *Melica ciliata*, *Thymus origanoides* (nob.), *Borrera Atlantica*, *Ferula communis?* a new species of *Gnaphalium*, *Ononis hebecarpa* (nob.), *Heliotropium Europæum*, *Statice puberula* (nob.), *S. pruinosa* (Delille), and *Lotus trigonelloides* (nob.). It is only upon Fortaventura that *Heliotropium Niloticum* has yet been gathered. *Argemone Mexicana* and *Scrophularia arguta* appear at wide intervals; we can scarcely, indeed, point out three stations in the whole Archipelago for these two plants.

The more we advance towards the centre of the Archipelago, the richer does the Flora become in Canarian species. This vegetation has its laws and distribution. When ascending the sides of the mountains, we pass successively through different climates, in each region there being some plants that abound according to the various degrees of elevation and advantages of exposure. The nemoral species, the *Pines*, the *Cytisus*, and *Adenocarpon*, with the vegetables of those high summits and elevated table-lands that Lancerotta and Fortaventura do not possess, swell the groupes of plants that inhabit the various heights. Along the shores, the temperature is similar to that of Mauritania, the coolness that the frequent mists maintain is delightfully felt in the *Laurel Forests* and adjacent ravines, while, above these spots, the air becomes more and more rarified, and the earth, almost bare of soil, produces very different plants. The presence or absence of the sun occasions the most striking atmospheric variations; by day the dryness of the air is most perceptible, and the heat almost suffocating, while the night, on the contrary, is damp and cold. Finally, on the loftiest peaks, the snows that accumulate during the stormy season, call to mind the chilly North, and the wintry aspect of our own alpine regions. Thus, does the aspect of the landscape perpetually change, a few hours sufficing to traverse all climates, and without requiring to visit distant latitudes; every step seems equivalent to a degree.

Still, even in this Western Groupe of the Canaries, which the learned Broussonet

distinguished from that of the East, because of the dissimilarity of their vegetation; the geographical formation and nature of the soil appear as if combined to isolate certain plants. A new species of a Cape Genus (*Manulea Canariensis* nob.), has established itself in the extinct crater of Bandama, while *Commelina Canariensis* affects solely the brink of rivulets in the environs of Ciudad and of Terror. At Palma, the *Umbilicus Heylandii*, (nob.) inhabits exclusively the Pine Woods of Barlovento; *Sempervivum Goochiæ* (nob.) shews itself only in the ravines of the East coast; while *Bethencourtia Palmensis* lies hid in the immense depths of the Caldera. These peculiarities are still more striking at Teneriffe: the *Statice arborea*, whose existence had been only known from a few plants of it cultivated in the garden of Oratava, grows nowhere but on the rocks of Burgado. Another *Statice (S. imbricata*, nob.) is confined to a desert islet, situated opposite Garachico; while *Gymnocarpum decandrum*, that highly curious individual of the *Paronychieæ*, first detected by Forskäl in Egypt, makes its appearance on the scoriæ of the promontory of Aguja. The existence of this latter plant in the Canaries was first ascertained by us; we were also the first to gather on these islands *Statice pruinosa*, *Traganum nudatum*, &c., &c.; and the statement advanced by M. Decaisne, in his Flora of Mount Sinai, that M. Von Buch had included these species in his catalogue, is doubtless incorrect. It is the same with many other plants whose several habitats are widely separated, or which are only found in a single spot. Among the latter, we may mention that *Euphorbia aphylla*, though common in the Canaries, at Teneriffe grows only near Buenavista; *Echium simplex*, *Lavatera phœnicea* and *Pterocephalus virens* (nob.) are known solely to the shepherds of Baxamar; *Reseda scoparia* inhabits exclusively the Point of Teno and the islet of the Great Canary; *Pistacia Lentiscus*, though very frequent in the latter island, has never been seen in Teneriffe, and *Cneorum pulverulentum*, again, so abundant in Teneriffe, does not grow at Palma. Examples of this kind might be easily multiplied, as will be seen in the general and comparative statement that we shall give of the Flora of each island.

The existence of these plants in such single stations, is as inexplicable as the similar instances which we shall relate respecting the forest-trees: these facts of vegetable distribution (epirréologie) are doubtless influenced by external circumstances, and the different kinds of circumambient medium in which they are placed. The illustrious Ramond meditated frequently on the mystery involved in the original dissemination of vegetables. When scaling the lofty and steep peaks of the Pyrénées, he was surprised both at the existence of some plants which he had not expected to see, and at the absence of others that he had confidently looked to have found there. "Nature," says he, "seems alternately indifferent to similarity of stations, and to the wide distance that divides them; sometimes uniting in parallel climates the productions of the most widely severed lands, and sometimes refusing this conformity of vegetation to those regions which seem to possess in common every characteristic of soil and of temperature." The laws of the distribution of germs over the surface of our globe can alone afford any explanation of these whimsical anomalies; but these laws are attributable to the first causes by which nature secretly works; the latter, again, are concealed from us, and it may be as long, perhaps, ere we shall be enabled to solve the mystery of these spontaneous creations, as to ascertain the rules for their fixedness, or their migration. Vainly might we strive to explain these great problems: the creation of plants on the earth was anterior to that of man, and to pry into times of which there exist no annals, could only lead to vague hypothesis. We prefer stating facts to dwelling on theories which must remain after all absolutely destitute of proof, and will therefore proceed to give an idea of that vegetable distribution which peculiarly claims our attention in the Canary Isles.

The amount of plants found on each is-

land is not equally distributed; the combination or insulation of the groupes in the different stations that intervene between the shore and the mountain-tops, depending considerably on the configuration of the ground, and the altitude of the mountains. In order to explain these changes, we will first give a general idea of the vegetation in the Western part of the Archipelago, and state how it is diffused over the soil, noting the transitions of form through which it passes, the different characters that it affects, and the aspect which it gives to the landscape. Taking Teneriffe, the most central and at the same time the most elevated island of the groupe, for a type of that geographical topography which is repeated, so to speak, to a greater or less extent on the adjacent islands, we will point out those analogies and those differences, which to ourselves have appeared most worthy of observation.

The coast of Teneriffe, like that of Canaria, Palma, Gomera, and the Isle de Fer, rises like a bulwark of cliffs, in sheer steeps, nearly from the water's edges, exhibiting in all directions, a wall of basalt edged by a very narrow strand. The plants of this maritime region take root in the cliffs, clothing their sides and the small platforms which surmount them. They are mostly fleshy-leaved species, which derive their chief nourishment from the atmospheric vapors, and the emanations of the sea-breeze. Such a soil, indeed, can only produce those succulent plants which inhabit the sea-coast. The species vary according to the sites which they occupy, some growing on the blocks of the cliff, and belonging to the *Chenopodeæ*, *Ficoideæ*, *Euphorbiæ*, and *Crassulaceæ*, &c.; while others, as *Zygophyllum Fontanesii*, (nob.), *Picridium Tingitanum*, *Astydamia Canariensis*, *Crithmum maritimum*, *Conyza sericea*, *Statice imbricata*, (nob.) and *S. pectinata*, *Frankenia pulverulenta*, &c., &c., may be seen on the very strand, where they are frequently washed by the waves.

The plants of the flat shores are sometimes diffused over the slopes of the vallies and in the interior of the ravines. Exposure frequently accounts for these anomalies; the air being charged with saline emanations, may, according to the formation of the coast, which offers a free passage to the sea-breeze, give birth, even at some distance from the shores, to those plants which require carbonate of soda. Still these plants cannot exist very far from the sea, their organization demanding a warm temperature where evaporation goes on quickly, for which reason they are only seen in low situations. Higher again, where frequent rain dispels the saline principles of the soil, a different tribe of vegetables appears, and though their structure may be succulent, as the *Semperviva*, still chemical analysis will prove that it is carbonate of potass, and not carbonate of soda, that they afford. Being endowed with strong powers of absorption, the *Semperviva*, a very numerous family in the Canary Isles, grow upon old walls, in the interstices of rocks, upon the most precipitous cliffs, and wherever the surface is such as that humidity lodges, without remaining there long.

Above these cliffs, the ground spreads out into a kind of primary platform, rising again towards the centre of the island into eminences, which are rent by ravines, and separated by intervening vallies. The vegetation that is disseminated over these slopes assumes an African character, and is remarkable for the prevalence of bare and tortuous trunks, and fleshy glaucous foliage. Here the Canary Island *Euphorbia* prevails, its large bushes frequently sheltering the lesser vegetables that are thinly scattered over the volcanic soil; the flowery branches of *Kleinias*, *Plocamæ*, and *Echium arborescens* waving over the massy *Euphorbias*, while *Periplocas* and *Rubias* twine into an impenetrable trellis-work. The glaucous verdure of these different plants produces no effect except in the mass, where those species whose leaves exhibit a brighter hue of green, contrast very pleasingly with the grey hue of the landscape; generally speaking, however, the plants are little seen, compared with the masses of tufa and of calcined

rocks. Among the species that generally inhabit these situations, are *Convolvulus floridus, Jasminum odoratissimum, Prenanthes arborea* and *P. pinnata, Messerschmidia fruticosa, Cneorum pulverulentum, Echium giganteum, Rumex Lunaria, Euphorbia piscatoria, Physalis aristata*, &c.

In the vallies of the coast on the contrary, indigenous vegetation seems to derive a new impulse from the vicinity of cultivation, and the wild plants to lose their nature in the midst of agricultural progress. There the hand of man is every where seen, and the aspect of the country is materially changed, recalling at one and the same time the wild champaign-land of Europe, with its orchards and vineyards, the lovely spots of tropical regions adorned with brilliant verdure, the Oases of the desert with their *Palm Trees* and springs, and finally that indigenous vegetation which it is vainly attempted to overcome, but which is continually producing its *Euphorbias* and other native plants. Thus, we continually behold the foreign species that have been naturalized, growing intermingled with the spontaneous productions of the soil; *Date, Papaw Trees, Orange, Peach*, and *Banana*, those numerous exotics that have been introduced from time to time, are associated with *Dragon Trees, Bosea*, and *Ardisia*. Two trees belonging to the primitive forests, the *Arbutus* and *Laurel*, contribute their foliage towards these varied groupes, while *Agaves* and *Nopals* (the *Cochineal, Cactus* or *Indian Fig)* weave themselves into thick hedges, over which the *Drusa* and *Canarina* entwine; the natural produce of the soil frequently succeeding in frustrating the labors of the cultivator, and resuming possession of its ancient domain.

Among the vallies, and on some portions of the shores, are districts where the nature of the soil effectually secures the primitive vegetation from agricultural invasion. Such are those barren spots which lie between the sea strand and the cultivated parts, and those fields of lava that surround the cones where the eruptions have taken place. To the former, the name of *Toscala* is given wherever volcanic tufa forms its basis, and the second kind of districts are called *Malpais*. Examples of both may be seen in Ténériffe, near Teno, in the vicinity of Sainte Croix, and in the vallies of Guimar and Orotava, and still more decidedly towards the North of the island, at the Point del Hidalgo, where the maritime hillocks are covered with species of *Artemisia, Lavender*, and *Thyme*, with other aromatic plants, most of them being woody and having ashy grey foliage. Among these are *Artemisia argentea, Lavandula pinnata, Sideritis Canariensis, Thymus Calamintha*, and *T. Teneriffæ, Plantago arborescens, Stachys Canariensis*, &c.

The uncultivated part of the valley of Guimar mentioned above, offers one of the best types of the vegetation peculiar to the *Toscalas;* there we found *Notoceras Canariensis, Gnaphalium cauliflorum, Buphthalmum sericeum, Fagonia Cretica, Aizoon Canariense, Saccharum Teneriffæ, Linaria scoparia* and *L. Elatine, Teucrium pseudo-iva, Plantago Coronopus, Micropus pygmæus*, &c. In the same locality first appear *Prenanthes spinosa* and *Cneorum pulverulentum*, both of which occur far more abundantly in the southern district of the island, where they grow together with *Zygophyllum Fontanesii* (nob.), *Euphorbia balsamifera, Aloe vulgaris* and *Justicia hyssopifolia*.

On the *Malpais* the following plants are combined with some of those already mentioned; *Polycarpæa gnaphalodes, Achyranthes argentea, Paronychia Canariensis, Salvia Ægyptiaca, Asparagus umbellatus, Forskälea fruticosa, Echium aculeatum, Frankenia ericæfolia, Rumex spinosus, Bupthalmum maritimum, Lycium Afrum, Datura Stramonium*, and *D. Metel, Hyoscyamus Canariensis, Mesembryanthemum nodiflorum* and *M. chrystallinum*, (which latter plant has been naturalized in these regions); and then come the *Euphorbias* with the greater proportion of those woody species that accompany them.

In the Great Canaria, the peninsula of

La Isleta presents also some analogous plants, amongst which, the *Euphorbias* and their allies invariably prevail. This peninsula, originally thrown up by furious subterranean fires, bears all the marks of volcanic origin; it is united to the Great Canaria by the isthmus of Guanartema; and many volcanic cones whose bases are encumbered by vitrified masses, rise above this devastated soil.

When nature had resumed its calm, La Isleta became a revered spot, which the superstitious terror of the inhabitants converted into a kind of Moraï. Heaps of scoriæ, piled in the form of tumuli, enclose the corpses of these islanders, and occupy the centre of the field of partially decomposed lava: there vegetation has begun to establish itself, and plants may be seen to spring from among the tombs. So singular and extraordinary is this spot, that nothing can be compared to it. The dead, interred in extinct craters,—the dust of an exterminated population mingling with volcanic ashes; and, above the vestiges of these two kinds of desolation, nature fulfilling her purpose and fertilizing the ruins with new productions: such is the picture which La Isleta presents to view! Large bushes of leafless *Euphorbias, E. Canariensis* and *E. aphylla*, spread like candelabra above these sepulchres, their crimson blossoms looking like burning lights, the *Plocamas*, with their drooping branches, resemble our Weeping Willow, while the *Orixama, (Cneorùm pulverulentum)* a terebinthaceous plant, still employed for the purpose of embalming, mingles its silvery boughs with the warm tints of that soil where the aborigines of the island repose. Among a great variety of plants, such as *Heliotropium erosum*, Reseda scoparia*, Chenopodium ambrosioides, Forskälea fruticosa, Buphthalmum stenophyllum*, Aizoon Canariense, Mesembryanthemum nodiflorum, Beta maritima, Zygophyllum Fontanesii** (nob.) and *Prenanthes spinosa**, we may specially remark *Physalis aristata, Conyza sericea* and *C. dichotoma* as peculiarly abundant in this locality, as well as *Convolvulus scoparius*, the rose-like scent of whose wood causes it to be particularly esteemed.

With the exception of those species marked above with an asterisk (and which are replaced by *Echium aculeatum, Frankenia corymbosa, Messerschmidia fruticosa, Physalis somnifera* and *Glaucium flavum*), the greatest part of the plants of La Isleta are found in similar situations of volcanic desolation at Palma. There, too, at Fuente Blanca and on the *Malpais* of Tazacorta and the craggy rocks of the eastern coast, vegetation has succeeded in establishing itself, on a soil originally devastated by volcanic agency.

But without descending to minute detail, we will continue to take Ténériffe as the type of that geographical distribution which is every where obvious.

The towns and villages of the coast, and those situated on the first level above the cliffs which border the shore, possess likewise their own Flora, interspersed, however, with several species that have been already named. The following plants, *Achyranthes nivea, Euphorbia Peplus, Senebiera didyma, Lappago racemosa, Aristida cærulescens, Datura Stramonium, Erigeron Canadense* and *E. viscosum, Urtica urens, Forskälea fruticosa, Hyoscyamus Canariensis, Parietaria Judaica* and *Oxalis corniculata* may be seen springing up in the interstices of the pavement and the less frequented streets; while in the town of Orotava, *Solanum pseudo-capsicum, Chelidonium majus* and *Viola odorata* grow all along the causeways, and many of the roofs of old buildings and the edges of walls are thus adorned. In Laguna, this town-flora is peculiarly remarkable. Among the plants of its streets we may mention *Ranunculus parviflorus* and *R. muricatus, Solanum nigrum, Lamarckia aurea, Malva parviflora, Thlaspi Bursapastoris, Polygonum aviculare* and *Trifolium subterraneum*. The species which grow against the walls and on the roofs are *Sonchus congestus, Sempervivum urbicum, S. Canariense* and *S. dichotomum, Geranium Robertianum, Thelygonum Cynocrambe, Hedera Canariensis, Campanula lobel-*

ioides, Asplenium palmatum, Cyathea fragilis and *Davallia Canariensis.* To these may be added *Kleinia neriifolia* and *Prenanthes pinnata,* which occasionally show themselves on the walls of such gardens as have a southern exposure, together with a few other species, common to most maritime towns.

Generally speaking, those towns which are situated on the sea-shore, possess some sporadic species, either accidentally introduced by importation, or produced by local circumstances. Thus *Argemone Mexicana* grows no where but on the volcanic soil of the town of Garachico and in the vicinity of the port of Arecifa on the Island of Lancerotta; of *Scrophularia arguta* the same may nearly be said; but the amount of species diffused over the towns situated at a distance from the coast is very much greater. La Laguna, that antient capital of Ténériffe, built by Alonzo de Lugo, the conqueror, on the outskirts of the forests, and at an elevation of 1722 feet above the level of the sea, enjoys a temperature which is peculiarly favorable for the development of urban or town plants. Several gothic dwellings, erected towards the conclusion of the 15th century, present a most singular appearance. These old buildings are clothed with *Ferns* and *Semperviva,* the heraldry above their gates is overgrown with moss, while this vegetation, clinging even to more modern edifices, imparts an air of antiquity which is peculiarly pleasing to the admirers of the romantic. Still, as M. Bory de St. Vincent observes, such a growth in a town gives but a poor idea of its population and activity to those individuals who may visit it for the first time, and who, being no Botanists, regard it as any thing but an ornament. All along the common roads, we meet with many of those plants which affect the edges of paths and the shelter of hedges. These are *Urtica morifolia, Galium Aparine, Daphne Cnidium, Hypericum Canariense* and *H. grandifolium, Cineraria Tussilaginis, Carduus clavulatus, Rubus fruticosus, Rubia fruticosa, Canarina Campanula, Begonia verrucosa, Arum Dracunculus* and *A. Arisarum,* and *Delphinium Staphysagria.*

Nature, ever varied in her productions, has diffused them everywhere, on the wave-buffetted rocks, upon buildings, by the sides of roads, among ruins, and even upon the monuments of the human race; and the germs, thus distributed, always propagate themselves in similar situations. Thus the moist walls of the city of Lugo are clad with a peculiar and continually renewed vegetation; while the Colisæum has its Roman plants, that for many centuries, have been reproduced from the dust of ruins.

If we compare those city or urban plants, just enumerated, with the Flora of the Colisæum, (see Sebastiani's *Enumer. Plant. spont. nascent. in Amphith. Flavii; Rom.* 1815,) we shall see that about half the number are common to the towns of Ténériffe and to the ruins of antient Rome; and most of the other species, noticed at Orotava and La Laguna, have their representatives in individuals of the same genera at the Colisæum. Still, notwithstanding these points of resemblance, the vegetation of Rome does not bear the same aspect as that of Laguna; those plants which clothe the antient manorial residences of the old capital of Ténériffe and even extend to its modern buildings, not growing on the houses in Rome, where the climate is much drier than that of La Laguna. Those which have established themselves on the Colisæum are almost entirely such herbaceous species as may generally be seen among rubbish, and which spring up among these extensive ruins as they might do on a calcareous hill. The *Soncha* and *Semperviva* of the city of Lugo are, on the contrary, of shrubby growth, they overtop the other urban species and excel all the similar productions of Europe in their lofty growth and the beauty of their flowers.

In the ravines of Ténériffe, vegetation appears under a fresher and more varied aspect; these defiles commence in the primary slopes of the central mountains and intersect the steeps that descend towards the coast. They are distinguished in this country, as *Vallies* or as *Barrancos*

according as their opposite sides are more or less apart from each other. Sometimes dry, sometimes watered by rivulets, these ravines continually present the most picturesque appearance; here the flat platform-like portions of the mountain close up the bottom of Thalweg, and suddenly interrupt its slope, when the lofty torrent, dashing over this interruption, falls in a cascade and works for itself deep hollows, all round which grow those plants which love a damp situation. Here we may meet with *Scirpus globiferus*, *Caladium nymphæifolium*, *Scrophularia betonicæfolia*, *Equisetum elongatum*, &c.; while many of the plants of Southern Europe also affect these localities,* as the very rare *Typha angustifolia*, *Mentha sylvestris*, *Nasturtium officinale*, *Apium graveolens*, *Arum Dracunculus*, &c.; and the *Potamogeton Canariensis* may be seen floating upon the stagnant waters.

Further on, portions of rock, severed from the neighbouring heights, form new obstacles to the course of the stream, and divide the volume of it. In proportion as we advance in these ravines, we find them becoming continually narrower, and presenting, in some places, lofty steep sides of extraordinary elevation. A vigorous vegetation adorns these basaltic walls, the clefts are filled with the penetrating roots of plants, and numerous different species, clinging to the rocks, adorn them with their blossoms: they fringe the narrow margins, are collected in masses on the level layers, and border the mountain-torrents; there we find those plants which eminently delight in shelter, the *Canary Island Willow* (*Salix Canariensis*) with beautiful pink catkins, *Solanum Nava* (nob.), the stems of which are climbing, *Bœhmeria rubra*, and *Poterium caudatum*, with feathery branches, together with many other rare species. The principal plants of the ravines are *Adiantum reniforme*, *Anthemis revoluta*, *Asparagus scoparius*, *Athamanta cerviariæfolia*, *Bosea Yervamora*, *Bupleurum salicifolium*, *Campylanthus salsoloides*, *Carlowizia salicifolia*, *Cheiranthus mutabilis*, *Crambe strigosa*, *Dactylis Smithii*, *Digitaria Canariensis*, *Ferula glauca*, *Galium Neesianum*, *Gymnogramma aurea*, *Justicia hyssopifolia*, *Lavandula abrotanoides* and *L. pinnata*, *Orchis tridactylites* (nob.), *Peucedanum aureum*, *Phyllis Nobla*, *Ranunculus cortusæfolius*, *Rhamnus crenulatus*, *Ruta pinnata*, *Sisymbrium millefolium*, *Stachys Canariensis*, *Tanacetum Canariense*, and *Teucrium heterophyllum*, together with many species of the genera *Bystropogon*, *Cineraria*, *Convolvulus*, *Conyza*, *Echium*, *Hypericum*, *Lotus*, *Pyrethrum*, *Sideritis*, *Sempervivum*, *Sonchus*, &c.

Several causes concur to collect a great variety of plants in these situations, sheltered from the African winds, and protected by the lofty cliffs that rise on either hand of these deep gorges from the heat of the sun, the trickling springs and mountain-torrents keep up the requisite degree of humidity, so that the plants of the ravines may immediately be distinguished from all others by their superior verdure and freshness, especially from those of the coast.

The most remarkable ravines in Ténériffe are those of *Badajos*, in the valley of Guimar, and of *Llarena*, in that of Orotava, those of *Tamadaya* and *Infierno*, in the southern district of the island, and *Barranco hondo* and *Acentejo*, on the opposite coast. The ravine of *Badajos* is bounded towards the West by the mountains of *Ladera de Guimar*, and in the opposite direction by the shifting soil of the valley. When this gorge is entered, we see its craggy sides, covered with plants, rising upwards of 800 feet above the torrent, of which it is necessary to climb the banks. A plate of this extraordinary ravine will be given in our Atlas, engraved by M. St. Aulaire, after an original design made by our friend J. J. Williams.

In the Great Canaria, the ravines are modified by the structure of the country, and no longer appear like those of Ténériffe in the form of long crevices radiating from the centre of the island towards its circumference; their torrents roll in the bottom of wide valleys, the bottom is less inclosed, and their general slope not so much interrupted. Hence arise a more

uniform soil, greater facility of cultivation and a very evident diminution in the number of indigenous plants.

In the island of Palma, again, the ravines resume the character of those in Ténériffe, they have steep-peaked sides, frequently so close to one another that the shrubs which wave from the opposite edges, form a twined roof of foliage above the stream that flows below. The great ravine *de las Augustias* is eminently worthy of notice, as it opens into the *Caldera* and the *Barrancos* of the eastern coast, and it afforded us the following new species:—*Sempervivum Goochiæ* (nob.), *Cytisus splendens* (nob.), *C. filipes* (nob.), and *C. stenopetalus* (nob.), *Lotus eriophthalmus* (nob.), and *Phagnalon umbelliforme* (nob.).

Towards their entrance, the productions of the ravines resemble those of the seashore, and at their upper extremity are identical with the growth of the forests. Thus, ascending to the higher parts of the island through these long defiles, we reach the region of the Woods. There vegetation becomes more compact, the trees, closely pressed together, almost exclude the rays of the sun, and by their sheltering branches and foliage protect the growth of many nemoral plants, to whose existence a damp situation and some depth of rich soil, are essential. When viewed with an eye to the picturesque, the Canary Island forests must excite the admiration of all those who visit them; but it is not our present intention thus to consider them, as they occupy a most important station in the Flora of these climates, so that we mean to reserve to a future chapter our observations on the grouping of the forest species, and the different changes that have taken place in these primitive woods, and shall confine ourselves, at the present time, to pointing out the principal trees and most remarkable plants.

The *Laurels* prevail over all the other species; they are four in number, *Laurus Canariensis* (nob.), *L. Indica*, *L. Barbusano*, and *Fersæa fœtens:* these grow in groupes, mingled with trees, arborescent *Heaths*, *Ilex*, *Visnea*, and *Arbutus*, namely *Erica arborea*, *Ilex Perado*, and *I. Canariensis*, *Visnea Mocanera*, *Arbutus Canariensis*, *Rhamnus glandulosus*, *Celastrus cassinoides*, *Myrsine Canariensis*, and *Olea excelsa*. Next after the *Laurels*, *Heaths* and *Ilex*, the *Ardisia excelsa*, *Cerasus Hixa*, *Viburnum rugosum*, and *Myrica Faya* are the most abundant species; *Bæhmeria rubra*, and *Pittosporum coriaceum* are very rare. Among the nemoral plants, the *Convolvulus* of the *Canaries* twines like a vine to the very top of the highest trees, while the beautiful Anemone-leaved *Geranium* inhabits the vicinity of the springs; *Ruscus androgynus* surrounds the old trunks, and a multitude of *Ferns* display in all directions their graceful fronds. The following plants, whose specific names sufficiently denote their origin, grow likewise in the forest region—*Digitalis Canariensis*, *Hedera Canariensis*, *Smilax Canariensis*, *Bystropogon Canariense*, *Genista Canariensis*, *Dracocephalum Canariense*, *Asplenium Canariense*, *Davallia Canariensis*, *Trichomanes Canariense*, *Astrodontium Canariense*, *Bryum Canariense.*

After traversing these primitive woods, we come to wasted plains, where vegetation, if allowed to proceed uninterruptedly, will finally restore the original aspect of the country. First, groupes of young *Laurels* and *Fayas* may be seen springing up again among the *Heaths;* then the latter, becoming more numerous, forbid the growth of any other plant; but when we proceed towards the higher region, these bushes, growing thinner and thinner, are almost lost among the species of *Cistus* and of *Pteris*. At the elevation of 3,600 feet, the stunted wood finally disappears, and the *Cistus vaginatus* reigns alone, spreading in large masses as far as the boundary of the Pine Woods.

In general aspect and form, the *Pine of the Canary Islands* considerably resembles the European species, the fir-woods calling to mind the alpine forests of our native land. Beneath these gigantic trees,

the soil is dry, and possesses little substance, while the number of nemoral plants becomes very limited: the principal among these few, are—*Helianthemum guttatum, Asphodelus ramosus, Thymus Calamintha, Lotus angustifolius, Pteris aquilina, Erigeron viscosum,* and a stunted state of *Hypericum grandifolium.* The *Pine-Trees* grow upon the steepest slopes, and cover the more elevated descents of the mountains. They are rarely seen to crown the table-lands which intervene among the crests; the edge of the chain which surrounds the Peak of Ténériffe appears arid and naked, such at least is the appearance from afar of its towering heights whose loftiest peaks attain a height of 9,000 feet; but when we actually reach these frowning rocks, the traveller is amazed to detect there several vegetables which he had seen absolutely no where else. It is necessary to scale the precipitous steeps of the *Sombrerito* to gather the *Carlina xeranthemoides, Cheiranthus scoparius, Pimpinella Cumbræ,* or *Plantago Teydea* (nob.). The *Tolpis lagopoda, Bethencourtia Palmensis,* and *Thymus Benthamii* (nob.) are confined to the Peak of Almendro; a single shrub, known to the shepherds by the name of *Pimientero de la Cumbre,* which is *Rhamnus coriaceus,* grows solely on the summit of Guaxara; some stunted *Junipers* (*Juniperus Cedrus,* nob.) crown the cone of Cedro; the Rose of Armida (*Rosa Armidæ,* nob.), and a beautiful variety of the *Pyrus Aria* inhabit exclusively two spots, considerably apart from each other, the mountain of Rosal and that part of the chain of Cañadas called *Tiro del Guanche.* All these plants, insulated on these volcanic ridges, vegetate there for centuries without propagating themselves on the adjacent Peaks. M. Mirbel has similarly had occasion to remark different instances of isolation, and has alluded to them in one of his finest works. "Mountainous countries," he says, "possess many species of limited or solitary habitats, which confine themselves to the heights, and are never found on the plains. Thus we see the Pyrénées, Alps, and Apennines possessing each its own Flora, while several of the individual mountains on these lofty chains nourish their peculiar species, which we might fruitlessly seek for in the surrounding districts."

When traversing the great circus of the Cañadas to reach the Teyda, the eye extends in all directions over sheets of tufa and torrents of vitrified lava. The Teyda, whose summit commands all the surrounding heights, rises like an immense dome above this disturbed soil; and yet this region, desolate as is its aspect, possesses also its peculiar plants. As soon as the steeps of the encircling mountains are passed, we behold, in all the wildness of nature, an aspect of vegetation which would lose all its originality if transplanted elsewhere. The shrubby *Leguminosæ* prevail in this district, which has been laid waste by successive volcanic eruptions. *Cytisus proliferus* is the first shrub which offers itself to view before we enter the gorges of the Cañadas; but when the central plateau is once reached, at an elevation of 7,000 feet, the *Adenocarpus frankenioides,* and then the *Cytisus nubigenus,* the former alone at first, and then both mingled together, obtain sole possession of the soil. The *Cytisus,* called by the natives *Retama,* prefers the volcanic tufa. The other stony substances are not, however, destitute of vegetation, many solitary species being found on the ancient beds of lava, as *Rhapontium Canariense* (of Dec. MSS.) which grows on the small table-land of *Masca; Chrysanthemum Broussonetii* in the defile of *Canada blanca, Echium Auberianum* (nob.), *Polycarpæa aristata, Scrophularia glabrata, Nepeta Teydeæ* (nob.), &c. on the piled-up scoriæ at the base of the Teyda. As soon as we begin to scale the heights of this Peak, so celebrated in the accounts given by former travellers, two species of different genera, much alike in the form of their foliage, and perfume of their blossoms, a Violet and a Campion (*Silene nocteolens,* nob., and *Viola cheiranthifolia*) suddenly make their appearance among the masses of pumice.

The *Retamas* become rarer, and finally

disappear at the height of 8,670 feet; but the *Violet* continues to brave the barrenness of the soil and the drought of the air, those sudden atmospheric changes that are frequently exhibited in the sphere of reaction of which the Peak is the centre, not appearing to affect its growth; it is even found above Altavista, nor is it till you reach the small table-land of the *Rambleta* that it ceases to be seen. Beyond this latter station, the *Flowering Plants* totally fail, the volcano seems to forbid all vegetation, a few *lichens* alone tinging its summit; while, at the edge of the crater, some minute *Mosses* (*Weissea verticillata, var.*, which is seen at 11,424 feet above the level of the sea), spring up in the crevices whence the warm vapours continually exhale.

After this general sketch of the Distribution of Plants over the lofty region of Téneriffe, if we give a glance at the corresponding stations on the adjacent islands, we shall perceive that vegetation there changes its aspect and becomes modified according to the height of the mountains and the nature of the country. Thus, the loftiest summits of the Great Canaria only attaining 5,842 feet, that is, about half the elevation of the central mountains of Téneriffe, neither the *Adenocarpus* nor the *Cytisus* of the Peak is to be seen. Still, the summits of Canaria, though destitute of arborescent vegetables, do possess their alpine plants, which are the representatives of those already enumerated as growing above the fir-woods of the other island. Two *Labiatæ* and one of the shrubby *Leguminosæ* (*Satureja tenuis* and *S. lunata*, and *Genista macrophylla*) grow on the ridges of the *Saucillo*, whose greatest height is 5,306 feet; while, towards the Valley of *Tiraxana*, the *Ridge of Manzanilla* has afforded us also three new species, *Prenanthes pendula* (nob.), *Satureja helianthemifolia* (nob.), and another climbing plant, which will probably be found to belong to the *Apocyneæ*.

Palma has presented us with similar observations. According to Mr. Von Buch's calculations, the loftiest part of this island attains a height of 7,234 feet; at this elevation in Téneriffe, we have already passed the limits of the *Adenocarpus*, and entered upon the region of the *Cytisus* of the Peak, yet Palma only possesses the former; its soil, both with respect to configuration and nature, by diminishing the influence of height, preventing the development of the latter species. The interior slopes of the mountains of Palma form, towards the centre of the island, the circumference of a primitive crater. When on reaching the brink of this fearful gulf, the eye glances with alarm down a depth of 4,500 feet, we may behold ancient forests starting from the enormous crevices which furrow the sides of the mountain, while not a shrub can be seen on the barren ridges that surround it. This higher region has an entirely peculiar character; it is not, as in Téneriffe, an immense circus, chiefly occupied by *Cytisus*, and where the decomposition of volcanic tufa is favourable to vegetation; but instead of a central platform surrounded by mountains in ruin, a different formation appears, the rocks of Palma being of basalt, while those of Téneriffe are trachytic. Huge masses of basalt lie severed in great blocks, and frowning peaks bristle the mountain-tops, and seem actually suspended over the abyss. On reaching these summits, where the compactness of the soil limits the growth of the *Adenocarpus*, and entirely excludes the *Cytisus*, we may find, all along the perilous margins, several species that never appear in lower stations; these are the *Arabis albida* of Caucasus, a shrubby variety of De Candolle's *Cerastium strictum*, and *Viola Palmensis*, which here takes the place of the *Viola cheiranthifolia* of the Peak of Teyda. Thus the spots that appear most utterly barren, often present the Botanist with his most valued acquisitions.

The observations that may be deduced from the distribution of plants over the Archipelago of the Canaries, rest upon a body of highly interesting facts. And when in investigating the islands in question, we scrutinize the different stations which these plants occupy, we might say, in observing

the choice of localities, that a sort of instinct seems to have led these germs to the very spots the most entirely favourable to their development.

CATALOGUE OF THE PLANTS FOUND ON TIMOR AND THE NEIGHBOURING ISLANDS.

(Communicated by M. SPANOGHE.)

RANUNCULACEÆ.

Clematis *biternata,* D C.
——— *Leschenaultiana,* D C.
——— *smilacina,* Bl.

ANONACEÆ.

Anona *squamosa,* Linn. } (*in cultis.*)
—— *reticulata,* Linn. }
Uvaria *velutina,* Dunal!
——— *glabra,* Span.
Unona *odorata,* Dunal!
——— *hamata,* Dunal!
——— ? *leptopetala,* D C.
Guatteria *rufa,* Dunal!

MENISPERMACEÆ.

Cocculus Japonicus, *var.* Timoriensis, D C.
——— *populifolius,* D C.
——— *glaucus,* D C.
——— *lepto stachyus,* D C.
——— *brachystachyus,* D C.

CRUCIFERÆ.

Sinapis *nigra,* Linn., *var.* rupestris, Span.
——— *Timoriana,* D C.

CAPPARIDEÆ.

Gynandropsis *pentaphylla,* D C.
Polanisia *viscosa,* D C.
Cadaba *capparoides,* D C.
Capparis *Mariana,* Jacq.
——— *dealbata,* D C.
——— *pubiflora?* D C.
——— *Volkameriæ?* D C.
——— *trapeziflora,* Span.
——— *sepiaria,* Linn., *var.* glabrata, D C.
——— *Roxburghii?* D C.
——— *nigricans,* Span.

VIOLARIEÆ.

Ionidium *frutescens.*

POLYGALEÆ.

Polygala *rufa,* Span.
——— *humilis,* Span.

CARYOPHYLLEÆ.

Bergia *ammannioides,* Roth.

MALVACEÆ.

Malva *Timoriensis,* D C.
——— *ruderalis,* Bl.
——— *horrida,* Span.
Urena *Lappago,* Smith.
Lebretonia? *cernua,* Span.
Hibiscus *Lampas,* Cav.
——— *tubulosus,* Cav.
——— *Timoriensis,* D C.
——— *ficulneus,* Linn.
——— *Rosa sinensis,* Linn. (*in hortis.*)
——— *pruriens,* Roxb.
——— *Surattensis,* Linn.
——— *vitifolius,* Linn.
——— *Pseudo-Abelmoschus,* Bl.
——— *Pseudo-palmatus,* Span.
——— *velutinus,* D C.
——— *phœniceus,* Willd. an *var.?*
——— *digitatus,* Cav.
——— *tiliaceus,* Linn., *var.* integrifolia.
Gossypium arboreum, Linn. (*in cultis.*)
Sida *acuta,* Burm.
—— *rhomboidea,* Roxb.
—— *retusa,* Linn.
—— *humilis,* Willd. *var.* veronicæfolia, Lam.
—— *rotundifolia?* Cav.
—— *Javensis,* Cav.
—— *elongata?* Bl. et *var. diversifolia,* Span.
—— *subcordata,* Span.
—— *Timoriensis,* D C.
—— *cistiflora,* Bl.
—— *Abutilon,* Linn.
—— *Asiatica,* Linn.
—— *populifolia,* Lam.
—— *paucifolia,* D C.

BOMBACEÆ.

Helicteres *grewiæfolia,* D C.
——— *microcarpa,* Span.

Bombax *Malabaricum*, D C.
Eriodendron *anfractuosum*, D C. (*in cultis.*)

BYTTNERIACEÆ.

Maranthes *corymbosa ?* Bl.
Sterculia *populifolia*, D C.
——— *cordata ?* Bl.
——— *fœtida*, Linn.
Theobroma *Cacao*, Linn. (*in hortis.*)
Abroma *mollis*, D C.
——— *fastuosa*, Brown.
Byttneria *flaccida*, Span.
Kleinhovia *Hospita*, Linn.
Melochia *acutangula*, Span.
Riedleia *tiliæfolia*, D C.
——— *corchorifolia*, D C.
Melhania ? *sidæflora ?* Span.

TILIACEÆ.

Corchorus *olitorius*, Linn.
Triumfetta *procumbens ?* Forst.
——— *suborbiculata*, D C.
——— *graveolens*, Bl.
Grewia *salutaris*, Span.
——— *pilosa*, Lam.
——— *multiflora*, Juss.
——— *tomentosa*, Juss.

ELÆOCARPEÆ.

Elæocarpus *angustifolius ?* Bl.
——— *cyanæus*, Sims *et* De Cand.

OLACINEÆ.

Olax *imbricata*, Roxb.
Ximenia *loranthifolia*, Span.

AURANTIACEÆ.

Triphasia *monophylla*, D C.
——— *trifoliata*, D C.
Limonia *acidissima*.
Murraya *paniculata*.
——— *heptaphylla*, Span.
Clausena *excavata*, Burm.
Micromelum *pubescens ?* Bl.
Sclerostylis *pentaphylla*, Bl.
Ægle *Marmelos*, Corr.
Citrus *aurantium*, mult. var.
——— *Decumana*.

GUTTIFERÆ.

Garcinia *elliptica*, D C.
Calophyllum *Inophyllum*.

HIPPOCRATEACEÆ.

Hippocratea *Indica ?* Willd.
——— *rigida*, Span.
——— *cassinoides*, D C.
——— *pauciflora*, D C.
Salacia *prinoides*, D C.

MALPIGHIACEÆ.

Hiptage *trialata*, Span.
Banisteria *dichotoma*, Linn.
——— *Timoriensis*, D C.

SAPINDACEÆ.

Cardiospermum *Halicacabum*, Linn.
Sapindus *salicifolius*, D C.
——— *rubiginosus*, Roxb.
——— *fraxinifolius*, D C.
Atalaya *bijuga*, Span.
Schmidelia *Bantamensis ?* Bl.
——— *Timoriensis*, D C.
Tina *rupestris*, Bl.
Melicocca *trijuga*, Juss.
Dodonæa *Burmanniana*, D C.

MELIACEÆ.

Melia *composita*, Willd.
Turræa *pinnata*, Span.
Cedrela *febrifuga*, Bl.
Aphanamixis *Blumei*, Span.
Didymocheton *nutans*, Bl.
Carapa *Moluccensis*, Lam.

AMPELIDEÆ.

Cissus *quadrangularis*, Linn.
——— *Indica*, Willd.
——— *adnata*, Roxb.
——— *Blumeana*, Span.
——— *aculeata*, Span.
——— *Timoriensis*, D C.
——— *crenata*, Vahl.
——— *lævigata*, Bl.
Ampelopsis *Indica*, Bl.
Leea *rubra*, Bl. ?
——— *hirta*, Horsf.

Balsamineæ.

Balsamina *minutiflora*, Span.

Oxalideæ.

Averrhoa *Carambola*, Linn. } (*in cultis.*)
——— *Bilimbi*, Linn. }

Rutaceæ.

Evodia *accedens?* Bl.

Zygophylleæ.

Tribulus *terestris*, Linn. *var.* Moluccensis, Bl.

Celastrineæ.

Celastrus *paniculatus*, Willd

Rhamneæ.

Zizyphus *celtidifolia*, D C.
——— *Timoriensis*, D C.
——— *rotundata*, D C.
Ceanothus *pubiflorus*, D C.
Ventilago *Madaraspatana*? Gaertn.
Gouania *tiliæfolia*, Lam.
——— *Mauritiana*? Lam.
Actageton *sarmentosum*, Bl.

Terebinthaceæ.

Holigarna *longifolia*, Roxb.
Mangifera *Indica*, Linn.
——— *glauca*? Bl.
Pistacia *oleosa*, Lour.
Spondias *mangifera*, Pers.
Icica? *Timoriensis*, D C.
Cañarium *commune*, Linn. (*in cultis.*)
——— *Pimela*, Koen.
Garuga *pinnata*, Roxb.
Cnestis *pentaphylla*, Span.
Brucea *Sumatrana*, Roxb.

Leguminosæ.

Crotalaria *laburnifolia*, Linn.
——— *juncea*? Linn.
——— *coluteoides*, Lam.
Indigofera *tinctoria* (*in cultis.*)
——— *Timoriensis*, D C.
——— *Leschenaultii*, D C.
——— *viscosa*, Lam.
——— *linifolia*, Retz.
——— *canescens*, Lam.
——— *cordifolia*, Roth.
Indigofera *glandulosa*, Willd.
Tephrosia *sericea?*
——— *Timoriensis*, D C.
Lonchocarpus? *fruticosus*, Span.
Sesbania *triflora*, Span.
Agati *grandiflora*.
Zornia *gibbosa*, Span.
——— *graminea*, Span.
Stylosanthes *aprica*, Span.
Æschynomene *atropurpurea*, Span.
——— *Timoriana*.
Lourea *obcordata*, Desv.
Uraria *comosa*, D C.
——— *crinita*, Desv.
——— *lagopodioides*, D C.
Nicholsonia *oxalidifolia*, Span.
Desmodium *auriculatum*, D C.
——— *Timoriense*.
——— *latifolium*, D C.
——— *umbellatum*, D C.
——— *maculatum*, D C.
——— *lineatum*, Span.
Flemingia *strobolifera*, Ait.
——— *lineata*, Roxb.
Alysicarpus *bupleurifolius*, D C.
——— *vaginalis*, D C.
Abrus *precatorius*, Linn.
Rhynchosia *sericea*, Span.
——— *rhombifolia*, D C.
——— do *var.* Timoriensis. D C.
Teramnus *uncinatus*, Swartz.
Dolichos *Cajan*, Linn. } (*in cultis.*)
——— *Sinensis*, Linn. }
——— *lobatus*, Willd.
Lablab *vulgaris*, Savi. (*in cultis.*)
Pachyrrhizus *angulatus*, Rich.
Canavalia *rosea*, Swartz.
——— *machæroides*, D C.
Mucuna *pruriens*, D C.
——— *gigantea*, D C.
Cajanus *flavus*.
Erythrina *Indica*, Lam.
Pongamia *glabra*, Vent.
Dalbergia *Timoriensis*, D C.
——— *repens*, Span.
——— *elliptica*, Span.
Pterocarpus *Indicus*.
Entada *Pursætha*, D C.
——— *monostachya*, D C.
Inga *moniliformis*, D C.

Inga *biglobosa*, Willd.
—— *pterocarpa*, D C.
—— *Timoriana*, D C.
—— *umbellata*, Willd.
Desmanthus *acinaciformis*, Span.
———— *trispermus*, Span.
Adenanthera *glauca*, Span.
Acacia *laxiflora*, D C.
——— *Farnesiana*, *var.* *pedunculata*, Willd.
——— *Lebbeckoides*, D C.
Moringa *polygama*, D C.
Guilandina *Bonduc*, minus, D C.
Cæsalpinia *Sappan*, Linn.
———— *paniculata*, Desv.
———— *Ki Laroe*, Span.
Poinciana *pulcherrima*, Linn.
Mezoneurum *glabrum*, Desf.
———— *scandens*, et *var.* inermis. Span.
Tamarindus *Indica*, Linn.
Cassia *Fistula*, Linn.
——— *Javanica*, Linn.
——— *Timoriensis*, D C.
——— *Tora*, Linn.
——— *angustissima*.
——— *occidentalis*; var. *aristata*, Coll.
——— *atrovirida*, Span.
Cynometra *cauliflora*, Linn.
——— *bijuga*, Span.
Bauhinia *tenuis*, Span.
——— *Timoriensis*, Span.
——— *purpurea*, Linn.

Combretaceæ.

Quisqualis *Indica*, Linn.
Terminalia *Moluccana*, Lam. (*in cultis.*)
——— *intermedia*, Span.

Santalaceæ.

Santalum *myrtifolium*, Linn.

Thymelaceæ.

Daphne *tenuiflora*, Span.
Dais *octandra*, Willd.

Loranthéæ.

Loranthus *triflorus*, Span.
——— *prælongus*, Bl.
——— *fuscus*, Bl.
Viscum *orientale*, Willd.

Rubiaceæ.

Bigelovia *stricta*, Spreng.
Polyozus *acuminata*, Bl.
Ixora *coccinea*, Bl.
Pavetta *odorata*, Bl.
——— *sylvatica*, Bl.
——— *paludosa*, Bl.
Psychotria *parviflora*, Span.
——— *rostrata*, Bl.
Pæderia *fœtida*, Linn.
Gonotheca *Blumei*, D C.
Oldenlandia *ramosa*, Roxb.
Ophiorrhiza *rugosa*, Wall.
Randia *maculata*, Span. et var. *nitida*, Span.
Dentella *repens*, Forst.
Guettarda *speciosa*, Linn.
Timonia *Rumphii*, D C.
Morinda *citrifolia*, Linn.
Nauclea *glabra*, Roxb.
——— *lanceolata*, (?)
——— *macrophylla*, Bl.
——— *sericea*, Span.
——— *glandulifera*, Span.

Strychneæ.

Strychnos *colubrina*, Linn.
Fagræa *tetragona*, Span.
Anasser *Rumphii*, Span.

Apocyneæ.

Carissa *Carandas*, Linn.
Tabernæmontana *heterophylla*, Span.
Cerbera *Odollam*, Gærtn.
Rauwolfia *Sumatrana*, Jack.
Vinca *rosea*, Linn. (*in hortis.*)
Plumeria *acuminata*, Dryand.
Altonia *scholaris*, R. Br.
——— *sericea*, Bl.
Vallaris *pergularia*, Burm. (*in hortis.*)
Helygia *Javanica ?* Bl.
Nerium ? *Jaspideum*, Span.
——— ? *macrocarpum*, Span.

Asclepiadeæ.

Calotropis *gigantea*, R. Br.
Pergularia *odoratissima*, Smith.
Dischidia *nummularia*, R. Br.
——— *cochleata*, Bl.

EBENACEÆ.

Diospyros *maritima*? Bl., et. var. *minor*, Span.
——— *dioica*, Span.
——— *microcarpa*, Span.

SAPOTEÆ.

Mimusops *obtusifolia*, Linn. (*in hortis.*)
——— *calyptranthifolia*, Span.
Achras *Sapota*, Linn. (*in cultis.*)

JASMINEÆ.

Jasminum *Sambac*, Linn. (*in hortis.*)
——— *elongatum*, Linn. fil.
——— *scandens*, Vahl.

MYRSINEÆ.

Ardisia *paniculata*? Bl.
Ægiceras *minus*, Pers.

SOLANACEÆ.

Lycopersicum *Humboldtii*, Dun.
Solanum *verbascifolium*, Linn.
——— *Irongum*, Poir.
——— *pseudo-saponaceum*, Bl.
Datura *Metel*, Linn.
Capsicum *frutescens*, Linn.
——— *fastigiatum*, Bl.
Physalis *pseudo-angulata*, Bl.
Nicotiana *Chinensis*? (*in cultis.*)

LOBELIACEÆ.

Lobelia *Zeylanica*, Pers.
Scævola *Könıgii*, Vahl.

CONVOLVULACEÆ.

Convolvulus *parviflorus*, Vahl.
Porana *volubilis*, Linn. *var. Burmanniana*, Bl.
Evolvulus *hirsutus*? Lam. *et var. lanceæfolius*, Span.
——— *pumilus*, Span.
Ipomæa *Quamoclit*, Linn. (*in hortis.*)
——— *paniculata*, R. Br.
——— *Pes Tigridis*, Linn.
——— *vitifolia*, Bl.
——— *hederacea*, Linn.
——— *capillata*, Span.
——— *Timorensis*, Bl.
——— *Bona Nox*, Linn.
——— *Batatas*, Poir. (*in cultis.*)
——— *ochroleuca*, Span.
——— *repens*, Roth. var.
——— *anceps*, Vahl.
——— *reptans*, Poir.
——— *setosa*, Bl.
——— *pulchra*, Bl.
——— *insuavis*, Bl.
——— *speciosa*, Linn. fil.
——— *trichotosa*, Bl.
——— *verrucosa*, Bl.
——— *bifida*, Vahl., var.
——— *nympheæfolia*, Bl.
——— *maritima*, R. Br.
——— *filicaulis*, Bl.
——— *pumila*, Span.

NYCTAGINEÆ.

Boerhaavia *diffusa*, Linn.
——— *angustifolia*, Span.
——— *minutiflora*, Span.
Pisonia *Limonella*, Bl.
——— *excelsa*? Bl.
——— *alba*, Span.

PLUMBAGINEÆ.

Plumbago *auriculata*, (flor. albo.)

PRIMULACEÆ.

Epithema *saxatile*, Bl.

RHINANTHEÆ.

Buchnera *nigrescens*, Span.

SCROPHULARINEÆ.

Buddlea *acumintissima*? Bl.
Gratiola *veronicæfolia*, Linn.
Herpestes *spathulata*, Bl.

BIGNONIACEÆ.

Spathodea *rostrata*, Span.
Millingtonia *dubiosa*, Span.
Bignonia *Indica*, Linn. (Calosanthes *Indica*, Bl.)

SESAMEÆ.

Sesamum *Indicum*, Linn.
Josephinia *Celebica*, Bl.

VERBENACEÆ.

Clerodendron *inerme*, Gærtn.

Clerodendrum *macrophyllum*, Bl.
Vitex *leucoxylon ?* et *var.* albiflora, Span.
—— *trifoliata*, Linn.
—— *Negundo*, Linn.
Premna *integrifolia*, Linn.
——— *parasitica*, Bl.
Callicarpa *cana*, Linn.
Tectona *grandis*, Linn. fil. (*ex Java allata*)
Avicennia *alba*, Bl.
Lippia *nodiflora*, Rich.

ACANTHACEÆ.

Justicia *bicalyculata*, Vahl.
——— *picta*, Linn.
——— *nasuta*, Linn.
——— *Gendarussa*, Linn.
Barleria *Prionitis*, Linn.
Thunbergia *Javanica*, Gærtn. fil.
Acanthus *ilicifolius*, Linn.
Nomaphila *corymbosa*, Bl.
Hegrophila *difformis ?* Bl.
Strobilanthes *involucrata*, Bl.
————— *arborea*, Span.
Lepidagathes *parviflora*, Bl.
Ruellia *repens*, Linn.
——— ? *suaveolens*, Span.

LABIATÆ.

Nepeta *disticha*, Linn.
Bystropogon *graveolens ?* Bl.
Leonurus *Sibiricus*, Linn.
Phlomis *Chinensis*, Retz.
Ocymum *polystachium*, Linn.
Plectranthus *bicolor*.

GENTIANEÆ.

Mitrasaeme *trinervis*, Span.

BORAGINEÆ.

Ehretia *lucida*, Span.
Cordia *Rumphii*, Bl.
——— *Timoriensis*, Span.
Tournefortia *argentea*, Linn.
————— *tetrandra*, var. *hirsuta*, Bl.
Tiaridium *Indicum*, Lehm.

ERICEÆ.

Bæobotrys *virgata*, Bl.

ARALIACEÆ.

Sciodaphyllum *verticillatum*, Span.
Panax *scutellarioides*, Reinwdt. (*in hortis.*)

UMBELLIFERÆ.

Hydrocotyle *Asiatica*, Linn.

COMPOSITÆ.

Elephantopus *scaber*.
Sphæranthus } doubtful whether new, or
————— } described species.
Vernonia *parviflora*, Reinwdt.
———— *linifolia*, Bl.
Conyza *balsamifera*, Linn.
——— *lacera*, Burm.
——— *pubigera*, Linn.
Lavenia *macrophylla*, var. repens, Bl.
Cacalia *sarmentosa*, Bl.
——— *sonchifolia*, Linn.
——— *sagittata*, Willd.
Verbesina *biflora*, Linn.
———— *urticæfolia*, Bl.
Eclipta *undulata*, Willd.
Chrysanthemum *Indicum*, Linn. (*in hortis.*)
Cotula *Maderaspatana*.

PASSIFLOREÆ.

Passiflora ? *Timoriana*, Span.
Modecca *cordifolia ?* Bl.

PAPAYACEÆ.

Carica *Papaya*, Linn.

CUCURBITACEÆ.

Bryonia *scabrella*, Linn. fil.
Momordica *Charantia*, Linn.
———— *bicolor*, Bl.
Luffa *fœtida*, Cav.
Cucumis *Melo*, Linn.
——— *sativus*, Linn.
Cucurbita *idolatrica*, Willd.
———— *hispida*, Thunb.
———— *farinosa*, Bl.
———— *Citrullus*, Linn.
———— *acutangula*, Bl.
Trichosanthes *tricuspidata*, Lour.

MYRTACEÆ.

Myrtus *macrophylla*, Spr. }
——— *Javanica*, Spr. } *Eugenia*, Linn.
——— *densiflora*, Bl. }
——— *obtusissima*, Bl. }
Calyptranthes *Jambolana*, Willd.

Psidium *pomiferum*, Linn.
Perigara *alata*, Span.
——— *globosa*, Span.
Barringtonia *speciosa*, Linn. fil.
——— *spicata*, Bl.
Punica *Granatum*, Linn.
Melaleuca *viridiflora ?* Smith.
Eucalyptus *alba*, Reinwdt.

RHIZOPHOREÆ.

Rhizophora *apiculata*, Bl.
Bruguiera *Rheedii*, Bl.

SALICARIEÆ.

Lagerstrœmia *floribunda*, Jack.
Lawsonia *inermis*, Linn.
Cryptotheca *dichotoma*, Bl.
——— *apetala*, Bl.
Pemphis *acidula*, Forst.
Lythrum *punctatum*, Span.

ONAGRARIEÆ.

Jussieua *suffruticosa*, Linn.
——— *fluvialis*, Bl.

PORTULACEÆ.

Portulaca *meridiana*, Linn.
Trianthema *polyandrum*, Bl.

CRASSULACEÆ.

Calanchoe *spatulata*, D C.

FICOIDEÆ.

Sphenoclea *Zeylanica*, Gærtn.

URTICEÆ.

Celtis *orientalis*, Linn.
——— *Amboinensis*, Willd.
——— *Timorensis*, Span.
Morus *Indica*, Linn.
Epicarpurus *orientalis*, Bl.
Trophis *spinosa*, Roxb.
Urtica *sanguinea*, Bl.
——— *cinerascens*, Bl.
——— *glomerata*, Klein.
Procris *formidata*, Span.
Ficus *Benjamina*, Linn.
——— *subcordata*, Bl.
——— *lutescens*, Bl.

(The other species of *Ficus* are not mentioned here, not knowing whether they are known or unknown species, which Mr. Blume must determine).

POLYGONEÆ.

Polygonum *oryzetum*, Bl.

CHENOPODEÆ.

Basella *alba*, Pluk.

AMARANTHACEÆ.

Amaranthus *polystachyus ?* Willd.
——— *spinosus*, Linn.
——— *retroflexus*, Linn.
Doehringia *Indica ?* Retz.
Ptilotus *amabilis*, Span.
Celosia *argentea*, Linn.
——— *cristata*, Linn.
Tryphera *prostrata*, Bl.
Cyathula *prostrata*, Bl.
Gomphrena *globosa*, Linn. (*in hortis.*)
——— *lanuginosa*, Span.

LAURINEÆ.

Litsæa *Timoriana*, Span.

MYRISTICEÆ.

Myristica *glauca ?* Bl.

EUPHORBIACEÆ.

Fluggea *Javanica*, Bl.
Glochidion *arborescens*, Bl.
——— *obscurum*, Bl.
Cicca *nodiflora*, Lam.
Melanthesa *rubra*, Bl.
——— *rhamnoides*, Bl.
Phyllanthus *anceps*, Vahl.
——— *Niruri*, Linn.
Croton *denticulatum*, Bl.
——— *pauciflorum*, Span.
——— *baliospermum*, Span.
Erythrocarpus *glomeratus*, Bl.
——— *spicatus*, Bl.
Codiæum *variegatum*, Bl.
Rottlera *tiliæfolia*, Bl.
——— *multiglandulosa*, Bl.
——— *paniculata*, Juss.
Adelia *Timoriana*, Span.
——— ? *scandens*, Span.
Conceveiba *Javanensis*, Bl.
Erythrochilus *Indicus*, Reinwt.
Janipha *Manihot*, Kunth, (*ex Java introducta).*

Jatropha *multifida*, Linn. *(in hortis.)*
——— *Curcas*, Linn.
Aleurites *Moluccana*, Willd.
Ricinus *communis*, Linn.
Mappa *Javanicus*, Juss. fil.
Acalypha *Indica*, Linn.
——— *hispida*, Willd.
Euphorbia *nereifolia*, Linn.
——— *lævigata*, Vahl.
——— *reniformis ?* Bl.
——— *serrulata*, Reinwt.
——— *thymifolia*, Linn.
Plukenetia *volubilis*, Willd.
Cleidion *Javanicum*, Bl.

PIPERACEÆ.

Piper *Betel*, Linn. (*in cultis.*)
—— *Siriboa*, Linn. (*in cultis.*)
—— *coccineum*, Span.

ARISTOLOCHIEÆ.

Aristolochia *acuminata*, Lam.
Tacca *palmata*, Bl.
—— *pinnatifida*, Forst.

ASPARAGEÆ.

Curculigo *orchioides*, Roxb.

SMILACEÆ.

Smilax *Zeylanica*, Linn.
——— *perfoliata*, Lour.

DIOSCOREÆ.

Dioscorea *sativa*, Linn.
——— *aculeata*, Linn.
——— *hirsuta*, Bl.
——— *bulbifera*, Linn.

AMARYLLIDEÆ.

Crinum *Asiaticum*.
Damasonium *Indicum*, Willd.

SCITAMINEÆ.

Canna *Indica*, Linn.
Curcuma *longa*, Linn.
——— *Zerumbet*, Roxb.
Zingiber *Americanum*, Bl.

AROIDEÆ.

Arum *trilobatum*, Pers.
Pothos *macrophylla ?*

ORCHIDEÆ.

Malaxis *cernua*, Willd.
Grammatophyllum ? *pulchrum*, Span.
Habenaria *Susannæ*, Bl.
——— *cornuta*, Span.
——— *mutica*, Span.

PALMÆ.

Cocos *nucifera*, Linn.
Areca *Catechu*, Willd.
Aringa *saccharifera*, Reinwt.
Borassus *flabelliformis*, Linn.
Corypha *umbraculifera*, Lam.

FILICES.

Acrostichum *speciosum*, Willd.
——— *inæqualis*, Willd.
Niphobolus *varius ?* Kaulf.
Polypodium *longissimum*, Bl.
——— *quercifolium*, Linn.
Aspidium *unitum*, Swartz.
——— *Amboinense*, Willd.
——— *ensifolium*, Schkuhr.
——— *florigerum*, Bl.
Asplenium *humile*, Bl.
Diplazium *marginatum*, Bl.
Adiantum *lunulatum*, Burm.
Davallia *patens*, Sw. *var.* tenuis ? Bl.
——— *biserrata*, Bl.
Pteris *vittata*, Linn.
—— *costata*, Willd.
—— *normalis ?* Don.
Lycopodium *circinale*, Linn.
Lygodium *circinnatum*, Sw.
Ophioglossum *ovatum*, Sw.
Ceratopteris *thalictroides*, Brongn.

ACCOUNT OF THE ARAUCARIA IMBRICATA OF CHILI.

From Dr. Poeppig's Travels in South America.

THE *Araucaria*, a tree that affords to the Indians of the Patagonian Andes a great part of their food, will not grow on the low lands, and it also preserves an accurately defined boundary with respect to its northern limits. When transplanted into many parts of the Province of Concepcion, it exhibits a sickly and deteriorated appearance, and vegetates so reluctantly

that from many fresh seeds which were sown in Talcahuano, only two sprung up, which shortly afterwards decayed. An alpine atmosphere and a severer climate than can be expected in the lower tracts of the country and, above all, a stony soil, seem to be indispensable to its growth. In the immediate neighbourhood of Antuco not a single tree of *Araucaria* can be seen, and it requires a fatiguing excursion to gratify the Naturalist's desire to behold a wood of these truly regal trees. Between Antuco and the Fort of Trun Leuvu, runs a narrow valley, which being short and full of a dense undergrowth, suddenly ascends and is connected with the defile through which the Rucuë flows, a narrow arch arising in its middle. A brook that runs at the bottom, Quillay Leuvu (the river of the Quillayas) gives its name. Accompanied by a jolly countryman, who had known better times, (for the Antucanos used to possess large herds,) and who could give me accurate information about the mountains, I travelled this road, which is now nearly forgotten and has been untrodden for many years. The thick vegetation prevented us from penetrating into the valley on horseback, and we therefore resolved, being each of us furnished with a woollen coverlet and some provisions, to proceed on foot. Such are the hindrances which everywhere impede the progress of those strangers, who, impelled either by scientific motives or by mere curiosity, quit the few roads which connect the rare inhabited spots in the Andes. In America the collector does not obtain his treasures so readily as in Europe; labours and dangers here unknown there attend the acquisition of perhaps only a few insignificant plants. All around the small villages or the solitary hut in which the traveller may have taken up his abode, stretches a wilderness, destitute of inhabitants, through which nothing but an accurate knowledge of the localities can enable him to find his way, or lead him to a path which may extricate him from his difficulties. The native, whom his occupation seldom induces to quit the immediate vicinity of his residence, and who feels no curiosity to visit the forests and uninhabited defiles of the mountains, is mostly unacquainted with them and cannot even aid the stranger by his descriptions. Thus the difficulty and delay, consequent on procuring a guide, often compel him to go alone. But if he be expert and accustomed to hardships, and is acquainted with the peculiarities of the country, so as to embolden him to venture on such an expedition, then the sense of independence and of increased self-confidence, arising from his success, will soon make him forget all the disagreeable feelings that first assailed him on his solitary journey. That he might suffer a lingering death and expire of starvation in places where no one could seek for him, or, seeking, would not find him,—that his return may be prevented by causes such as these, are thoughts that must not dwell upon his mind and which indeed seldom come across the traveller when he, with great danger, attains the summit of a lofty and hitherto unvisited rock, or finds his exertions repaid by the harvest of new and beautiful things that surround him in a deep and dark defile, shut out from the sight of all mankind.

At the lower end of the valley which I have described, a fire had been raging, and all the trees stood without bark, the greater part even with half-charred stems. The wood itself is much altered by such a circumstance; for while its colour and compactness are improved for the purposes of manufacture, it becomes useless for fuel and receives the name of *Pellin (Madera apellinada)*. Forest conflagrations often occur, from unknown causes, even in the uninhabited districts of the Andes, and consume every thing, up to the elevation where the Chilian Kneewood and the dwarf *Beech Tree* grow, near the limits of perpetual snow. After such fires, the forest never again throws up lofty stems, but produces only a thick underwood that envelopes and destroys the higher trees that may have escaped. It is most curious to observe the new and peculiar vegetation that in all parts of America succeeds such an occurrence. In Pennsylvania the few forests that have

hitherto escaped the ravages of the axe and of fire, resemble a park, being quite free from shrubs; but scarcely has the tract been burned, when a *Rhododendron*, before unseen, shoots up, particularly on the lofty mountains, which presents indeed a lovely spectacle, being loaded with flowers, but forms an impenetrable thicket. In places where not a single tree has escaped the devouring element arises a bushy *Oak*, the *Scrub Oak* (*Quercus ilicifolia*), impeding the progress of the hunter, and proving the greatest enemy to the farmer, as its roots run deep and throw up new shoots so readily, that it is almost impossible to eradicate it. In the warmer tracts of this part of the world, the consequences are still more apparent. The formidable stinging *Tree-Nettle* (*Urtica baccifera*, Linn.), the ugly species of *Psychotria* and *Piper*, presently occupy the bounds of the woods in Cuba, and where cultivation is not promptly and speedily employed, an impenetrable mass of crooked-thorned *Smilaces*, *Ipomœas*, and other climbing plants soon occupy the soil. How similar causes are seen to operate on the vegetable kingdom in the Andes of Peru, and in the primitive forests of Maynas, I shall hereafter take occasion to mention.

In Chili such burned places soon present the powerfully-stinging *Loasas*, with erect or climbing stems, followed by shrubs whose seeds are prickly, and attach themselves to every surrounding object, *Acænas*, *Uncinias*, and many others: shortly after, the *Colliguaja* gets a footing, an arborescent grass which characterizes the districts of Chili, as does the *Bamboo* the warm climes of Asia, and as the endless confusion of climbing *Scelerias* distinguishes the tropical parts of America. The stems of the *Colliguaja* shoot up in great numbers from their creeping roots, and in a rich soil attain an elevation of twelve to eighteen feet, tufted, for their whole length, with succulent green leaves, and covered with so hard a polished yellow bark as resists the knife: they are, moreover, extremely elastic, and by incautiously bending them, you may chance to receive a smart blow. Every where, from the sea to the Upper Andes, these trees seem to find a suitable habitat, but near the snow-line they dwindle to mere shrubs, between which it is with great difficulty you can force a path, and not without many a fall, as the feet easily slip on their smooth stems, which stretch at length along the ground. This plant is no less useful to the Chileno than is the Bamboo to the native of Asia, many parts of his house consist of the *Colliguaja*. But the detriment this plant occasions is almost still greater when it has migrated into a field newly prepared for cultivation, for after the burning of the primitive forests, living roots still remain, and in the first spring, the stems of this grass rapidly spring up between the young seed, and, as autumn draws on, prevent the harvest. It is hardly possible to succeed in extirpating the root, for where the smallest portion remains, there is a bud for a fresh brood, with which it requires continual labour to combat. The numerous fallen trunks obliged us to take circuitous ways over the pathless steep mountain-sides. Still, many beautiful plants rewarded this exertion, the beautiful *Tropæolum* (*T. speciosissimum*, Pœpp.), with many other very remarkable plants, grew there; as *Myrtus bullata*, *M. chrysocarpa*, *Perezia prenanthoides*, *Senecio obscurus*, *Sida stelligera*, *Gerardia Chilensis*, *Dichroma pallens*, and *D. alpinum*, all new species: these present themselves abundantly over the shady bushes, and, with their red purple flowers, render themselves conspicuous from a great distance.

Towards the evening we had ascended the moderately high ridges that form the back-ground of the valley; and the dense crown that was seen above these, from afar, had indicated our near approach to the desired aim, and added new vigour to our exertions. When we arrived at the first *Araucarias*, the sun had just set, still some time remained for their examination.

What first struck our attention, were the thick roots of these trees, which lie spread

over the stony and nearly naked soil, like gigantic serpents, two or three feet in thickness: they are clothed with a rough bark, similar to that which invests the lofty pillar-like trunks, of from fifty to a hundred feet in height. The crown of foliage occupies only about the upper quarter of the stem, and resembles a large depressed cone. The lower branches, eight or twelve in number, form a circle round the trunk; they diminish till there are but four or six in a ring, and are of most regular formation, all spreading out horizontally, and bending upwards only at their tips. They are thickly invested with leaves, that cover them like scales, and are sharp-pointed, above an inch broad, and of such a hard and woody texture, that it requires a sharp knife to sever them from the parent branch. The general aspect of the *Araucaria* is most striking and peculiar, though it undeniably bears a distant family-likeness to the Pines of our country. Its fruits, placed at the ends of the boughs, are of a regularly globular form, as large as a man's head, and consist of beautifully imbricated scales that cover the seeds, which are the most important part of this truly noble tree. The *Araucaria* is the Palm of those Indians who inhabit the Chilian Andes, from lat. 37° to 48°, yielding to these nomade nations a vegetable sustenance that is found in the greater plenty, the more they recede from the whites, and the more difficult they find it to obtain corn by commerce. Such is the extent of the *Araucaria* forests (Pinares), and the amazing quantity of nutritious seeds that each full-grown tree produces, that the Indians are ever secure from want, and even the discord that prevails frequently among the different hordes does not prevent the quiet collection of this kind of harvest. A single fruit (*cabeza*, "a head,") contains between two and three hundred kernels, and there are frequently twenty or thirty fruits on one stem. And as even a hearty eater among the Indians, except he should be wholly deprived of every other kind of sustenance, cannot consume more than two hundred nuts in a day, it is easily seen that eighteen Araucarias will maintain a single person for a whole year. The kernel, which is the shape of an Almond, but double the size, is surrounded with a coriaceous membrane that is easily removed; though relishing when prepared, it is not easily digestible, and containing but a small quantity of oil, is apt to cause disorders in the stomach with those who are not accustomed to this diet. When the scarcely-mature seeds are dried in the sun, a sugary substance exudes, which appears to reside chiefly in the embryo. The Indians eat them, either fresh, boiled, or roasted, and the latter mode of cooking gives them a flavour something like a Chestnut. For winter's use they are dried, after being boiled, and the women prepare a kind of flour and pastry from them. The collecting these fruits would be attended with great labour, if it were always necessary to climb the gigantic trunks: but as soon as the kernels are ripe, towards the end of March, the cones drop off of themselves, and shedding their contents on the ground, scatter liberally a boon, which nothing but the Little Parrot (*Psittacus choraeus*, Mol.) and a species of Cherry-Finch divide with the Indians. In the vast forests, of a day's journey in extent, that are formed by these trees in the districts of Pehuenches and Huilliches, the fruits lie in such plenty on the ground, that but a very small part of them can be consumed. In former times, a great quantity came to Concepcion and Valdivia, by trading with the Indians, and thence they found their way to Valparaiso and Lima, but now they are seldom seen any where near the coast, or they are too old to be palatable. The reason why all the seeds of *Araucaria* that hitherto were sent to Europe did not vegetate, is because the collectors did not procure them from the Indian country, but bought them in the market at Valparaiso, where they are offered for sale boiled and dried. My excursion to Quillay-Leuvu obtained for me fresh seeds of the Araucaria, which reached Germany in October, 1829, being seven

months after they were ripe, and being sowed immediately, the period was just that of the Chilian spring. Of some hundreds, about thirty came up, but ignorance of the true climate, which led to the error of placing the young plants in a hot-house, killed the greater part during the first year. To my great satisfaction, however, about six individual plants have been preserved in different places, and they are, to the best of my belief, the only ones in Europe.[1] The specimen in the Botanic Garden at Leipzic flourishes beautifully, it is about twenty inches high, and already bears four long branches in whorls. The wood of the *Araucaria* is red where it has been affected by the forest fires; but otherwise it is white, and, towards the centre of the stem, bright yellow. It yields to none in hardness and solidity, and might prove valuable for many uses, if the places of growth of the tree were less inaccessible. For ship-building it would be useful, but is much too heavy for masts. If a branch be scratched, or the scales of an unripe fruit be broken, a thick milky juice immediately exudes, that soon changes to a yellowish resin, of which the smell is agreeable, and which is considered by the Chilians as possessing such medicinal virtues, that it cures the most violent rheumatic headaches, when applied to the spot where the pain is felt.

The Araucaria forest of Antuco is the most northerly that is known in Chili, so that the boundary of this king of all the extratropical American Trees, may be estimated at 36° south latitude. The extreme southern limit is not so clearly ascertained, which is not surprizing, when we consider how little, comparatively, is known of western Patagonia; it seems probable, however, that it does not stretch far beyond lat. 46°. Between Antuco and Valdivia this tree only grows among the Andes, and as the Indians assert, solely on their western declivities, and no where lower than from 1,500 to 2,000 feet below the snow-line, up to which they frequently reach. Further to the South, the *Araucaria* appears at a lower elevation, and in the country of the Cuncos and about Osorno is said to occur on mountains of a very moderate altitude near the sea. The Corcovado, a mountain that rises opposite Chilöe, is said to be studded, from its foot to the snow-line, with large groupes of these beautiful trees. Of all other vegetation, the *Araucaria* forests are as bare as the Pine-woods, offering but few plants which can interest the Botanist. Steep rocky ridges, where there is no water, are its favourite habitat. We were obliged to seek this needful article at a considerable distance from our bivouac; but, our frugal supper not requiring much cooking, we soon stretched ourselves on the hard rock to sleep, under the lullaby of a storm, to which the lofty summits above us imparted the most singular tones. All of us who had been accustomed to such primitive beds might have rested well enough, if a fog had not descended upon us about midnight, which was so dense, as nearly to extinguish our fire. Matters became still worse, when violent thunder and hail apprized us that not even a forest of Araucarias could shelter the traveller from the wrath of the Cordillera.[2] We all trembled; my companions, however, chiefly from fear and superstition, though the temperature was sufficiently low to occasion a shudder in thinly-clad travellers. The anxiously looked for morning brought a brighter sky, and the means of kindling a cheerful and genial fire. A young man, who had joined us the preceding day, succeeded (by means of his lasso, which he threw over one of the lowest branches) in ascending a tree, from which he brought down many branches, loaded with their truly colossal fruit, which have since arrived safely in Germany.

[1] Many were raised previous to this period, by Mr. Murray, at the Glasgow Botanic Garden, from seeds sent by Mr. Cruckshanks, from Chili.

[2] See Colonel Hall's Travels in the Quitenian Andes.

SYNOPSIS OF THE BUCHNEREÆ, A TRIBE OF SCROPHULARIACEÆ.

By George Bentham, Esq., F.L.S.

The materials from which the subjoined paper has been taken, are chiefly two extensive collections of South African Scrophulariaceæ, the one transmitted to me for examination, by Messrs. Ecklon and Zeyher, from their own Herbarium, the other being a complete set of Mr. Drège's Scrophulariaceæ presented to me by Mr. Ernest Meyer, of Kœnigsberg. For the genus *Buchnera* I have also been furnished with several notes by Mr. Brown, who has kindly allowed me to examine that genus in his New Holland Herbarium, and has presented me with specimens of most of the species, and Mr. Allan Cunningham has entrusted me with the whole of his collection of the same genus. I have also availed myself of the Herbaria of Linnæus, of the British Museum, of Sir W. J. Hooker, of Dr. Lindley, as well as of my own, and have thus verified most of the published species, with the exception of Humboldt's and some of Sello's South American ones.

My chief difficulty has been in the determining Thunberg's species. It is indeed true, as remarked by Mr. E. Meyer, that his descriptions, when given in detail, are better than he is usually given credit for, but so large a number are so vaguely described, without attention to the important characters derived from the flower, that their identity with specimens before us must be matter of conjecture, until they can be compared with his Herbarium. In quoting this author, the work I have made use of is Schultes's edition of his Flora Capensis, published at Stuttgard, in 1823.

Three Linnæan genera, *Buchnera, Erinus*, and *Manulea*, have been included in the tribe of *Buchnereæ*, and appear to have been considered by many authors as so many common receptacles for all Scrophulariaceæ with slender tubes to the corolla and plane lobes to its limb; the scabrous species, which dry black, being referred to *Buchnera*, and the remainder to *Erinus* or *Manulea*, according to whether the lobes of the corolla were supposed to be bifid or entire.

The character originally given by Linnæus to *Buchnera* (Hort. Cliff. 501), appears to have been framed from the species which he afterwards (Spec. Pl. ed. 1. 630.) removed to *Erinus*, under the name of *E. Africanus*, and, in his Genera Plantarum, he modified the character of *Buchnera* so as to make it applicable to his *B. Asiatica*, and it is from the set of plants designated by him under this name that the chief points of his subsequent descriptions are taken. In his Systema Naturæ, however, apparently by some error, he has exchanged the characters of *Buchnera* and *Erinus*, which error Willdenow has copied without perceiving that he thus gives to *Buchnera* a character applicable to only a small portion of the species he includes in it, and which these possess in common with the greater number of his *Erini;* and to *Erinus* one which is at complete variance with every one of the species.

Eleven years, however, previous to the publication of the 3rd vol. of Willdenow's *Species*, Jussieu had already (Gen. Pl. p. 100,) so modified the character of *Buchnera* as to make it comprehend, though somewhat vaguely, those two series of plants, of which the *B. Americana* and *B. Asiatica* may be considered as the types, in which he was followed by Lamarck, Persoon, and other French Botanists; but none of them followed it up by any examination of the heterogeneous species usually enumerated under the generic name. Brown first (Prod. Fl. Nov. Hol. 293) distinguished these two series as sections of *Buchnera*, giving to the whole genus and to each section definite and comprehensive characters which could thenceforth leave no doubt as to their limits.

With regard to *Erinus*, Linnæus, as also Jussieu and their immediate followers took their character and descriptions from the *E. alpinus* (which it now appears must be removed from the tribe) enumerating, however, as species, more or less of the South African *Buchnereæ*. Willdenow, as has been said, continued to join them,

following Linnæus's mistake in giving to the group part of the character of another genus, and Persoon, in a manner very unusual to the author of the Enchiridion, contrived to add to the blunder a portion of Linnæus's previous descriptions, so as to make up a character contradictory to itself. Other writers have usually copied Linnæus, Jussieu, Willdenow, or Persoon, until Don (Sw. Brit. Fl. Gard. 2nd Ser. 3. t. 239) confined the genus *Erinus* to the *E. alpinus,* and established a new one under the name of *Nycterinia* for the *E. lychnidea,* Linn., with a very detailed character which unfortunately disagrees in many material points with two of the four species he refers to it.

Manulea of Linnæus was originally established for the *M. Cheiranthus,* and has been so characterised by almost all subsequent authors as to be applicable only to that species and one or two others with subulate lobes to the corolla, although they all of them refer to it many plants that have oblong, obovate, or even emarginate lobes. Bergius, however, under the name of *Nemia* had given a rather more general character, applicable at least to the two species he enumerates, an example in which to this day he does not appear to have been followed.

The great affinity between *Buchnera, Manulea,* and the Cape *Erini,* has been frequently observed, and Don proposed to consider them as a tribe, of which I published a character in the Botanical Register for July, 1835, at the same time that Don gave a nearly similar but more detailed and confined one in Jamieson's Journal for the same month. It appears, however, from a further examination of the few species we formerly possessed, and of the large number of new ones now before me, that we had neither of us given sufficient latitude to the variations in the form of the corolla, nor attached sufficient importance to the positive character derived from the unilocular anthers, and that we had both of us included genera which ought to be removed to other tribes. I am also still of opinion that the calyx, placentation, and seeds as described by Don, ought not to form part of the essential character of the tribe.

The *Buchnereæ,* as I should now propose to circumscribe them, are essentially distinguished from *Hemimerideæ* by the want of any glandular concavities or spur at the base of the corolla, from *Antirrhineæ* by the valvular dehiscence of the capsule (when not fleshy) and the unilocular anthers, from *Salpiglossideæ* and *Digitaleæ* by the ascendent stamina and constantly unilocular anthers, from *Gratioleæ* and *Gerardieæ* by the unilocular anthers alone, from *Rhinantheæ* by the latter character and by the upper lip of the corolla (when bilabiate) not being concave, from *Veroniceæ* by the stamina almost constantly didynamous, or if diandrous, with the anthers approximate, and from *Buddleieæ* by the same character, as also by the corolla, which is always pentamerous or irregular.

The only tribe between which and the *Buchnereæ* it is difficult to draw a definite line is that of the *Verbasceæ.* Generally speaking, the rotate or short-tubed corolla of the latter tribe, removes it widely from the *Buchnereæ,* which have usually a remarkably slender, long tube, but the old *Buchnera viscosa* (my *Sphenandra*) has precisely the corolla and anthers of *Nefflea,* whilst on the other hand, there is a gradual change in the form of the corolla which renders it impossible to remove it from those old *Manuleæ* which I have placed in my genus *Chænostoma;* in habit it is as near to the one as to the other. As its stamina are slightly ascending, and not declinate, as they had at first appeared to me, I have preferred retaining it amongst *Buchnereæ* to removing it to *Verbasceæ,* as I had proposed in Lindley's Natural System, 2nd edit. p. 292.

The essential character of *Buchnereæ* may therefore be thus stated:—

Corollæ limbus 5-fidus vel inæqualiter 4-fidus, interdum bilabiatus, laciniis omnibus planis. Stamina adscendentia, didynama, vel rarius 2 approximata. Antheræ uniloculares. Capsula bivalvis, val-

vulis integris bifidisve, rarissime carnosa indehiscens. To this might be added, *Stylus apice integer, stigmate simplici;* which appears to be universal in the tribe.

With this character the genera *Erinus,* (as confined to *E. alpinus,*) *Sutera,* and *Sophronanthe,* which I have enumerated in Lindley's Natural System as belonging to *Buchnereæ,* would be removed to *Gratioleæ* on account of their bilocular parallel-celled anthers, and *Escobedia,* which Don includes in his list, would remain in *Gerardieæ,* where I placed it in my Synopsis of that tribe, p. 202 of this "Companion."

The *Buchnereæ* thus circumscribed are readily divisible into two very distinct groups: the *Eubuchnereæ,* in which the valves of the capsule are entire, with a loculicidal dehiscence, and the *Manuleæ,* in which they are more or less bifid and septicidal. The former contain a set of plants which are usually rigid, more or less scabrous, and almost always dry black; the *Manuleæ,* if hairy, are generally glutinous, seldom scabrous, and comparatively few of them dry black.

The *Eubuchnereæ* consist chiefly of the genus *Buchnera* as limited by Brown, but whose sections I should propose to adopt as genera, the difference in the structure of the corolla being connected with a considerable difference in habit. It is for the first of these sections, containing the species with straight-tubed hypocrateriform corollas, that I should propose to retain the Linnæan name in preference to that of *Piripea,* given by Aublet to one of the species, as the plants of this section are perhaps the most universally known, and being the most numerous, there would thus be the fewest published names to change. Amongst the species contained in Mr. Brown's second section, having an incurved tube with a bilabiate limb, is the plant published by Dupetit-Thouars, under the name of *Campuleia,* and Mr. Brown has ascertained that another species (probably *B. hirsuta,* Wall.) is the *Striga* of Loureiro, which that author erroneously described as diandrous, with an unilocular capsule. The latter name being the oldest, is the one I have adopted.

Buchnera, thus limited, would contain, besides the several Australian species of Brown's first section, and the East Indian ones of the section *Piripea* enumerated in my Scrophularineæ Indicæ, all the American *Buchneras* and five species now first described. *Striga* would include Brown's two Australian species, the East Indian species of the section *Campuleia* of my Scrophularineæ Indicæ, the two species of Thonning's described by Schumacher, and three new ones.

To these genera I have to add two new ones, *Rhamphicarpa,* distinguished chiefly by the oblique capsule, containing the *Gerardia tubulosa,* Linn., and two unpublished species; and *Cycnium,* a MSS. name of Mr. E. Meyer's, under which I have joined two South African plants intermediate in some respects between the *Buchnereæ* and the *Gerardieæ.* In the one, *C. adonense,* the capsule appears to be fleshy and indehiscent, the flower is that of an *Escobedia,* but unfortunately in all the specimens I possess, the stamina are eaten away by insects; the other, *C. racemosum,* has a much shorter-tubed corolla, and the capsule is not yet formed in the specimens before me, but the stamina are perfect and precisely those of the *Buchnereæ;* and the remarkable calyx in both species has induced me to join them, taking the generic character from the one or the other according as I have been able to examine them. If I am wrong, it will be for future Botanists to correct my error from more perfect specimens.

The group of *Manuleæ,* which are all South African, has been usually considered as containing two genera: the *Cape Erini* or *Nycterinia,* with bifid lobes to the corolla, and *Manulea,* with entire lobes, a distinction which however is not practically followed up, for the *Erinus fragrans,* Ait., and *E. tristis,* Thunb., have the lobes entire, or nearly so, nor is it at all conformable to habit; besides, there are so many species in which the lobes are so slightly emarginate as to render it impossible to

determine to which group they should be referred, that I have attached little or no importance to that character. At the same time the species now known consist of several groups really very different from each other in appearance, and I have therefore sought to divide them upon other principles.

The calyx has afforded the first characters. In some it is tubular, shortly divided into five teeth, disposed in two lips, which, as the capsule swells, are split nearly or quite to the base. In the others the five divisions are from the first flowering equally split to below the middle. This distinction appears also to be universally accompanied by another circumstance, that in the former group the withered corolla remains even at the maturity of the capsule, whilst in the other it falls off long before.

The first of these groups again contains two series of plants, too different in habit to be united into one genus, and the stamina have furnished a good character. In the one which contains most of the Cape *Erini*, and for which I have therefore retained Don's name of *Nycterinia*, the upper pair of stamina are inclosed in the tube with oblong-linear anthers, and the lower pair are placed at the mouth with shorter ovate anthers, sometimes sterile or entirely wanting. In the other series, which I have named *Polycarena*, from the number of small heads in which the flowers are usually collected, the anthers are all similar to each other, and appear at the mouth of the tube, or are quite exserted.

Nycterinia will naturally follow immediately after the *Eubuchnereæ*. Like them, many of the species dry black, and the valves of the capsule, although bifid, are often coriaceous. The tube of the corolla is always long, and the inflorescence spicate. The limb of the corolla is sometimes deeply bifid, sometimes entire, thus separating the species into two sections, too closely allied in all other characters as well as in habit to be considered as distinct genera. To the first section I have referred *Erinus maritimus*, *lychnideus*, *africanus*, and *selaginoides*, Thunb., *E. capensis*, Linn., (which is probably *E. æthiopicus*, Thunb.), and five new species, to the second *Manulea divaricata*, Thunb., and probably also *Erinus villosus*, Thunb., with two new species.

Polycarena, with the calyx and persistent corolla of *Nycterinia* has a very different habit. It consists of low-growing annuals, the flowers are often very small, collected into heads which afterwards lengthen out into spikes, and the flowers, in the dry state at least, are yellow or whitish, without ever turning black. The floral leaf adheres to the very short pedicel, or even to the calyx, as in *Phyllopodium*. In the *Polycarena capensis* and *gilioides*, the tube of the corolla is elongated, but the habit and stamina sufficiently distinguish them from *Nycterinia*.

To *Polycarena* I refer the *Manulea plantaginea*, *capillaris* and *æthiopica* of Thunberg, which appears different from the *Buchnera æthiopica* of Linnæus, and the *Buchnera capensis*, Linn., or *Manulea capensis*, Thunb., with four new species.

The second group of *Manuleæ*, or those with a regular bifid calyx and a corolla almost always deciduous, may also be subdivided according to whether the stamina be exserted with uniform anthers, or included, two of them at least, within the tube of the corolla with dissimilar anthers. Amongst those which have the exserted stamina, the *Buchnera viscosa*, Linn., (to which I refer the *Manulea cærulea*, Thunb.) must stand alone, on account of its rotate corolla. It forms my genus *Sphenandra*. The remaining species form two groupes so very different in habit, that although the characters are not so positive as could be wished, I have adopted them as separate genera.

The one which I have called *Phyllopodium*, is closely allied to the small-flowered *Polycarenæ*, and indeed is scarcely to be distinguished, but by the equally five-cleft calyx and more deciduous corolla. Like in *Polycarena*, the floral leaf adheres to the pedicel (usually very short) so as to appear to proceed from its apex, whence the generic name. This character and the minute corolla, besides the habit, alone

distinguish the genus from *Chænostoma*. In appearance some species come so near to the Selagineæ as only to be known from them by an inspection of the ovarium or fruit, on which account there is much doubt about the old species. I have, however, determined with tolerable certainty, as species of *Phyllopodium*, the *Manulea cuneifolia*, *capitata* and *heterophylla* of Linn. and Thunb., and added three new species.

Next to *Phyllopodium* and *Sphenandra*, I should place *Chænostoma*, which like them has exserted anthers, but has a corolla contracted at the base into a tube which is often elongated, and always campanulate or infundibuliform at the orifice. In this respect *Chænostoma* differs also from the *Manuleæ* with included stamina, and it is most readily distinguished from *Phyllopodium* by the floral leaves, which do not adhere to the pedicel. It includes the *Manulea linifolia*, *integrifolia*, *revoluta*, *cephalotes*, *cordata*, and *hispida* of Thunb., which last is the *M. oppositiflora* Vent., with the *Buchnera æthiopica*, Linn., and *fœtida*, Andr. (*Manulea fœtida* and *alternifolia*, Pers.), and seventeen species which I have not been able to refer to any published descriptions.

The remaining *Manuleæ*, with a five-cleft calyx, deciduous corolla, and included dissimilar anthers, again comprehend two groups different in habit but difficult to characterize, at least from dried specimens. To the first of them I have given the name of *Lyperia*, partly because it contains the *Erinus tristis*, and other species with that peculiar-coloured flower, and partly because the corolla almost constantly, and often the whole plant dry black; on which account no doubt it is that they seem to have been as often referred to *Erinus* as to *Manulea*. It is characterized chiefly by the two upper lobes of the limb of the corolla forming a sort of upper lip, and the tube being more or less gibbous or incurved near the apex, and usually viscous. In the true *Manuleas*, on the contrary, the lobes of the corolla are equal and equidistant, or the four upper ones are rather longer and more joined than the lower one (whence the name *Manulea*), the tube is straighter and either downy or glabrous. In inflorescence they are very different; in *Lyperia* the pedicels are constantly uniflorous and axillary, or if racemose or spicate, they have leafy bractes at the base, whilst the flowers of *Manulea* usually form a compound raceme with many-flowered peduncles, or if the raceme is simple the bracteæ are very minute. In *Lyperia*, moreover, the flowers are never of that bright orange-red which is the usual colour in *Manulea*. In both genera the tube of the corolla is long and slender, the orifice not dilated, and the lobes of the limb vary from entire to emarginate, and even bifid.

To *Lyperia* may be referred the *Erinus simplex*, *incisus*, and *tristis*, Thunb., the *E. fragrans*, Ait., the *Manulea microphylla*, *argentea*, *pinnatifida*, Thunb., *Buchnera pedunculata*, Andr., *Man. violacea*, Link, which appears to be the *Erinus patens*, Thunb., and sixteen species, which I believe to be hitherto unpublished. *Manulea*, as above defined, would be limited, among published species, to the *M. incana*, *tomentosa*, *cheiranthus*, *thyrsiflora*, *corymbosa*, *altissima* and *rubra* of Linn. and Thunb., the *M. angustifolia*, Link, being referable to *M. rubra*, and *M. rhynchantha* to *M. cheiranthus*. I have, in addition to these, now described twenty new species.

Of the remaining *Buchnereæ* of authors, *Erinus tomentosus*, Thunb., *Manulea antirrhinoides*, *virgata* and *hirta*, Linn. or Thunb., and *Manulea crystallina*, Weinm., are evidently either *Lyperiæ* or *Chænostomata*, but I cannot recognize them in any of the specimens before me; *Buchnera canadensis*, and *Erinus Peruvianus* and *laciniatus*, Linn., have already been referred to *Verbena*, and *Buchnera grandiflora*, Linn. to Escobedia, *Buchnera cernua*, *cuneifolia* and *pinnatifida* form a Selagineous genus to which Mr. E. Meyer has given the MSS. name of *Chascanum; Buchn. cordifolia*, Linn., is *Streptium asperum*, Roxb., and *Erinus Africanus*, Schum. Pl. Guin. 278, (excl. Syn. omn.) is evidently

a *Herpestis*, and probably *H. Monniera*.

In their geographical distribution, the *Buchnereæ* are all extra-europæan. The genus *Striga* extends over the southern portion of Africa and Asia to North Australia on the one hand, and to South China on the other; *Buchnera*, within the same limits in the Old World, is found in the New World East of the Andes from the United States to the Rio Grande; *Rhamphicarpa* is South and Tropical African with one species extending into East India, *Cycnium* and the whole of the *Manuleæ* are South African, and, as far as hitherto known, extra-tropical.

CONSPECTUS OF THE GENERA.

* *Capsulæ valvulæ integræ.*

1. STRIGA. *Corollæ* tubus abrupte incurvus, limbus bilabiatus.

2. BUCHNERA. *Calyx* breviter tubulosus 5-dentatus. *Corolla* hypocrateriformis. *Capsula* recta.

3. RHAMPHICARPA. *Calyx* campanulatus 5-fidus. *Corolla* hypocrateriformis. *Capsula* oblique rostrata.

4. CYCNIUM. *Calyx* longe tubulosus foliaceus. *Corolla* hypocrateriformis. *Capsula* recta, carnosa.

** *Capsulæ valvulæ bifidæ.*

5. NYCTERINIA. *Calyx* bilabiatus. *Stamina* 2 inclusa, antheris oblongo-linearibus, 2 subexserta, antheris brevibus vel abortiva.

6. POLYCARENA. *Calyx* bilabiatus. *Antheræ* omnes exsertæ consimiles.

7. PHYLLOPODIUM. *Calyx* 5-fidus. *Antheræ* omnes exsertæ consimiles. *Bracteæ* pedicello adnatæ.

8. SPHENANDRA. *Calyx* 5-fidus. *Antheræ* consimiles exsertæ. *Corolla* rotata.

9. CHÆNOSTOMA. *Calyx* 5-fidus. *Antheræ* exsertæ consimiles. *Bracteæ* a pedicello liberæ. *Corolla* campanulata vel infundibuliformis.

10. LYPERIA. *Calyx* 5-fidus. *Antheræ* 2 inclusæ oblongo-lineares, 2 ad faucem vel inclusæ breves. *Corollæ* tubus apice gibbus vel incurvus, limbo subbilabiato. *Pedunculi* axillares vel in racemis vel spicis foliaceo-bracteatis dispositi.

11. MANULEA. *Calyx* 5-fidus. *Antheræ* 2 inclusæ longiores, 2 ad faucem vel inclusæ breves. *Corollæ* tubus rectus, limbus subæqualis. *Racemus* nudus sæpius compositus.

I. STRIGA. *Lour.*

Buchneræ sp., *Linn. et Auct.*—Campuleia, *Dup. Thou. Gen. nov. Mad.*

Calyx breviter tubulosus, costis 5—15 elevatis striatus, inter costas membranaceus, apice 5-dentatus vel semi-5-fidus, dentibus sæpius subulato-acuminatis; rarius abortu 4-dentatus. *Corollæ* tubus tenuis, ad medium vel sæpius supra medium abrupte incurvus, limbus bilabiatus, labio superiore sæpius breviore integro emarginato vel bifido, inferiore trifido. *Stamina* didynama tubo inclusa. *Capsula* recta, valvulis subcoriaceis integris, maturitate elastice dehiscentibus, medio septiferis. Herbæ *Africanæ vel Asiaticæ scabræ, siccitate sæpius nigricantes, interdum more Orobanchidum parasiticæ.* Folia *infima opposita, superiora alterna, nunc squamæformia, sæpius linearia, integerrima vel rarissime paucidentata, floralia conformia gradatim minora.* Flores *axillares solitarii sessiles, in spicas terminales dispositi, sæpius minute bibracteati.*

* *Folia squamæformia.*

1. *S. orobanchioides*, glabra, ramosa, foliis minutis squamæformibus, floralibus lanceolatis calyce brevioribus. Tab. XIX.

Buchnera orobanchioides, *Br. Endl. in Bot. Zeit.* 1832. 2. 388. *t.* 2.—*Benth. Scroph. Ind.* 40.

Buchnera hydrabadensis, *Roth. Nov. Pl. Spec.* 292.

Buchnera gesnerioides, *Willd. Spec. Pl.* 3. 338.

Orobanche Indica, *Spreng. Syst.* 2. 817. *non Roxb.*

HAB. Senegambia, *Endlicher*, Abyssinia, *Brown*, South-East Africa from Steenboksvlakte in the district of Uitenhage, *Ecklon*, to Delagoa Bay, *Forbes*, East Indian Peninsula, *Wight*, &c., and plains as far as Saharunpur, *Royle*. (v. s.)

I here copy Dr. Wight's description made from living specimens, observing only that I find the calyx as often unequally

five-cleft, as figured in the plate (which is presumed by Dr. Wight to have been an error in his draughtsman) as four-cleft, as mentioned in the description :—

"Parasitic, from three to eight inches high. Root tuberous, about the size of a walnut. Stem none, unless the unbranched portion of the scape can be so called. Scape simple at the base, and furnished with scattered scales, branched upwards, and furnished with a few distant opposite scales or bracteas: the whole is covered with short stiff hairs. Scales and bracteas lanceolate. Flowers sessile, surrounded with three bracteas. Calyx shortly hairy, four-cleft; segments lanceolate, with a broad dark line or nerve running from the apex of each down to the base of the calyx-tube. Corolla glabrous, of a pale sepia-tint, hypocrateriform; tube three times the length of the calyx, slender, arched near the top: limb five-partite; the lowest segment the largest, and with the two lateral ones obovate and slightly retuse; the two upper recurved smaller than the others, oblong obtuse. Stamens four, inserted above the middle of the tube, two of them a little longer than the others, all glabrous. Ovary ovate, slightly compressed, ovules very numerous. Style slender, straightish, a little shorter than the tube of the corolla, persistent. Stigma simple, thickened. Capsule ovate, slightly compressed, two-valved, loculicidal. Seeds minute, oval, slightly pitted.

"This I first found on low hills at Palaveram, near Madras, parasitic on the roots of *Lepidagathis cristata*. I afterwards gathered it in a similar soil and situation near Madura, but did not ascertain the plant on which it grew. The specimens figured are from hills in the Salem district."

TAB. XIX. Fig. 1. Calyx laid open to show the Pistil. 2. Corolla laid open, showing the Stamens. 3. Section of the Ovary :—*magnified.*

** *Folia elongata. Calyces 5-striati. Corolla versus apicem incurva.*

2. *S. humifusa*, prostrata, scabra, foliis obovato-oblongis obtusis, spicis brevibus paucifloris, calycibus 5-striatis ?, corollæ tubo glabro.

Browallia humifusa, *Forsk. Fl. Æg. Arab.* 12.

Buchnera humifusa, *Vahl. Symb.* 3. 81.

HAB. Mountains of Hadje, in Arabia, *Forskahl.* (*v. s. in Herb. Banks.*)

From the very imperfect specimen in the Banksian Herbarium, I have not been able to ascertain whether the calyx is in fact five-ribbed, but the form of the leaves and procumbent stem will readily distinguish it from all others.

3. *S. parviflora*, pusilla, scaberrima, foliis linearibus integerrimis strictis, calycibus 5-striatis, corollæ pubescentis labio superiore integro inferiore vix duplo breviore.

Buchnera parviflora, *Br. Prod.* 294.

HAB. Australia, Keppel Bay on the East Coast, *Brown.* (*v. s.*)

A small plant, but little branched; flowers smaller than in any other species.

4. *S. aspera*, foliis linearibus integerrimis strictis ramisque calloso-tuberculosis et pilis patentibus rigidis ciliolatis, calycibus 5-striatis, corollis glabris tubo elongato tenui, labio superiore emarginato inferiore duplo breviore.

Euphrasia aspera, *Willd. Spec.* 3. 197.

Buchnera aspera, *Schum. Beskr. Pl. Guin.* 280.

HAB. Western Tropical Africa, Guinea, *Willdenow*, Ningo, *Thonning*, Cape Coast, *Herb. Banks.* (*v. s.*)

The Banksian specimen is more branchy than described by Schumacher, and the flowers are not so large as in *Glechoma*, yet I have no doubt it is the same species. It closely resembles *S. parviflora*, but differs in the corolla, which is twice as large, and in the more regular and greater hispidity of the plant.

5. *S. curviflora*, scaberrima, foliis elongato-linearibus integerrimis subpatentibus, calycibus 5-striatis, corollæ tubo pubescente, labio superiore retuso inferiore triparto ter breviore.

Buchnera curviflora, *Br.! Prod.* 294.

HAB. Australia, on the North coast, *Brown.* (*v. s.*)

Allied in habit to *S. euphrasioides* and *coccinea*, differs from the former by the

calyx, from the latter by both calyx and corolla.

6. S. *multiflora*, scabra, ramosissima, foliis elongato-linearibus patentibus, spicis elongatis laxis, calycibus 5-costatis, corollis glabris, labio superiore bifido inferiore tripartito parum breviore.

HAB. Australia, on the islands West of Goulburn Island, North coast, *A. Cunningham*. (*v. s.*)

Distinct both in the long almost decumbent habit, and in the form of the flower, which is about the size of that of *S. coccinea*.

7. *S. densiflora*, humilis, glabriuscula, scaberrima, foliis lanceolato-linearibus subsquarrosis, floribus densis approximatis, calycibus ovatis 5-striatis, corollis glabris, labio superiore emarginato inferiore bis terve breviore.

Buchnera asiatica, *Vahl. Symb.* 3. 81. ? *Linn.! Spec.* 879, *ex parte*.

Buchnera densiflora, *Benth. Scroph. Ind.* 41.

HAB. East Indian Peninsula, *Heyne*, &c., and plains of India as far as Saharunpur, *Royle*. (*v. s.*)

A small rigid plant, three to five inches high, and but little branched; in some respects resembling *S. Thunbergii*. Flowers smaller, the lobes of the limb shorter and broader. It differs also from that species in the remarkably patent, often recurved leaves.

8. *S. Thunbergii*, hispido-scabra, stricta, subsimplex, foliis lanceolato-linearibus erectis, floralibus lanceolatis adpressis nervo subtus margineque ciliato-hispidis, spica densa, calycibus 5-striatis, corollæ tubo pubescente apice recurvo inflato, limbi labiis parum inæqualibus lobis oblongis.

Buchnera asiatica, *Linn.! Spec.* 879, *ex parte*.

Buchnera bilabiata, *Thunb. Fl. Cap.* 465.

Buchnera linearifolia, *Schum. Beskr. Pl. Guin.* 279. ?

β. grandiflora.

HAB. Extratropical South Africa, in the district of Uitenhage, and in Cafferland and Tambukiland, *Ecklon*, *Drège*, &c. in the valley of Frideriksberg, in Guinea, *Thonning*? — β. in Cafferland, *Drège*, *Ecklon*. (*v. s.*)

Taller and more erect than *S. densiflora*, it is easily distinguished by its imbricate floral leaves, and the remarkably dilated apex of the tube of the corolla. The flower varies much in size, being from six to eight or ten lines in length. I have very little doubt that Thonning's plant is the same species, for though the pubescence of the plant is not absolutely appressed, it may be said to be so in comparison to that of *B. aspera*.

*** *Folia elongata. Calyx* 10—15-*striatus. Corolla versus apicem incurva.*

9. *S. elegans*, hirsuto-scaberrima, stricta, subsimplex, foliis lanceolato-linearibus erectis subadpressis hispidis, floralibus consimilibus calyces æquantibus, calycibus 10-striatis, corollæ tubo pubescente, limbi lobis oblongis labio superiore bifido inferiore parum breviore.

HAB. Southern extratropical Africa, *Herb. Hooker*, Cafferland, *Drège*. (*v. s.*)

Stature and habit nearly that of *S. Thunbergii* β, but less rigid, the flowers rather larger, and like *S. lutea*, the whole plant is very hairy, and scarcely turns black in drying.

10. *S. lutea*, (Lour. Fl. Cochinch. 22?) hirsuto-scaberrima, foliis elongato-linearibus patentibus inferioribus lanceolatis, spicis elongatis, calycibus 10—15-striatis, corollæ luteæ tubo glabro, limbi lobis obovatis, labio superiore emarginato inferiore duplo breviore.

Buchnera hirsuta, *Wall.* — *Benth. Scroph. Ind.* 41.

B. asiatica, *Linn. Spec.* 879, *ex parte*.

HAB. East Indian Peninsula, *Wight*, Bengal, *Wallich*, Saharunpur, *Royle*, Macao, *Herb. Banks.*? and Canton, *Loureiro*? (*v. s.*)

Habit lax and branching, or, when young, more rigid and simple, seldom turning black when dry, height from six inches to a foot.

11. *S. phœnicea*, humilis, villosa, scaberrima, foliis lanceolatis obtusis patentibus, spicis densis, calycibus 10-striatis, corollis phœniceis glabris, limbi lobis obovatis, la-

bio superiore emarginato inferiore duplo breviore.

Buchnera phœnicea, *Wall. Benth. l.c.* 41.

HAB. East Indian Peninsula. (*v. s.*)

Very near *S. lutea*, from which it may not be really distinct, although it appears so from dried specimens, and is said to have a red flower.

12. *S. coccinea*, glabriuscula, scabra, foliis elongato-linearibus, calycibus oblongis 10-striatis, spicis laxis, corollis coccineis glabris, limbi lobis obovatis, labio superiore emarginato inferiore duplo breviore.

Campuleia coccinea, *Hook.! Exot. Fl.* 3. *t.* 203.

Buchn. coccinea, *Benth. Scroph. Ind.* 40.

B. asiatica, *Linn.! Spec.* 879, *ex parte.*

HAB. Tropical Africa and Southern Asia: Sierra Leone, *Herb. Banks.*, Cafferland, near Port Natal and Omcomas, *Drège*, Mozambique, *Forbes*, Mauritius, *Telfair*, East Indian Peninsula, *Heyne*, Macao, *Herb. Banks.?* (*v. s.*)

This comes nearest the laxer specimens of *S. lutea*, but is much more glabrous, and usually dries black. I am doubtful whether the Macao specimens in the Banksian Herbarium (which appear to be the same as those described by Loureiro) belong to this species, or to the *S. lutea*, as they are in some measure intermediate, and the colour of the flower described by Loureiro as yellow, appears red from the dried specimens.

This species has been supposed by Hooker to be the one described by Dupetit-Thouars as parasitical. From the dried specimens it has less of that appearance than the *S. lutea*, and especially the *S. Thunbergii*, which latter has also red flowers.

13. *S. glabrata*, glabriuscula, scabra, foliis elongato-linearibus, calycibus oblongis 10—15-striatis, spica tenui, corollis (cærulescentibus?) glabris, limbi lobis oblongis, labio superiore emarginato inferiore duplo breviore.

Buchnera asiatica, *Benth. Scroph. Ind.* 40. *Linn. Spec.* 879 *ex parte.*

HAB. East India, Nepal, and mountains of Ava, *Wallich*, also in the Peninsula? (*v. s.*)

Much more slender than any of the preceding, it evidently comes near the *S. euphrasioides*, but differs in its glabrous corolla. The flowers are said to be bluish, they dry nearly of the colour of those of *S. euphrasioides.* I had originally considered this to be the one Linnæus had specially in view in describing his *B. asiatica*, but I find from his herbarium that he applied that name to all the *Strigæ* he was acquainted with, I have therefore thought it adviseable, in removing the present species to the genus *Striga*, to alter its specific name.

14. *S. euphrasioides*, glabriuscula, scabra, foliis elongato-linearibus integerrimis paucidentatisque, calycibus oblongis sub-15-striatis, corollæ tubo pubescente.

Buchnera euphrasioides, *Vahl, Symb.* 3. 81.

Buchnera angustifolia, *Don. Prod. Fl. Nep.* 91.

Buchnera asiatica, *Linn. Spec.* 879. *ex parte.*

HAB. East India from the Peninsula to the mountains of the North, *Wight*, *Wallich*, *Royle*, *&c.* (*v. s.*)

Distinguished from all the preceding ones of this section by the pubescent corolla, and long striated calyx.

15. *S. Masuria*, elata, scaberrima, foliis integerrimis linearibus appressis strictis, calycibus sub-15-striatis elongatis, corollæ tubo elongato tenuiter pubescente limbo amplo.

Buchnera Masuria, *Hamilton*, *Benth. Scroph. Ind.* 41.

HAB. East India; mountains of Morang, *Hamilton*, Prome, *Wallich.* (*v. s.*)

Flowers twice as large as in *S. euphrasioides.*

16. *S. Forbesii*, elata, scaberrima, pubescens, foliis lineari-lanceolatis dentatis, calycibus profunde fissis 10-striatis laciniis linearibus foliaceis, corollæ tubo elongato tenuiter pubescente versus apicem incurvo.

β. grandiflora.

HAB. Madagascar and Mozambique, *Forbes.* (*v. s.*)

Near *S. Masuria*, but less rigid and the leaves broader. Calyx seven to eight lines long. Corolla about the size of that of *S*

Masuria and in the var. β, nearly as large as in *Rhamphicarpa tubiflora.*

**** *Corolla ad medium abrupte incurva.*

17. *S. hermonthica*, pilosiuscula, scabra, foliis linearibus, floralibus lanceolatis ciliatis, calycibus 5-striatis, corollæ tubo glabriusculo ad medium incurvo, limbo amplo.

Buchnera hermonthica, *Del. Fl. Ægypt.*

Hab. Western Africa, Upper Egypt, near Silsileh, *Jordan*. Mozambique, *Forbes.* (*v. s.*)

A handsome species above a foot high with a long spike of large red flowers.

II. Buchnera. *Linn.*

Piripea. *Aubl. Pl. Guian.*

Calyx breviter tubulosus obscure 10-nervius, apice breviter 5-dentatus. *Corollæ* hypocrateriformis tubus tenuis exsertus, rectus vel parum incurvus, limbus patens subæqualis 5-fidus, laciniis oblongis vel obovatis. *Stamina* didynama, tubo inclusa. *Capsula* recta valvulis subcoriaceis integris, maturitate elastice dehiscentibus, medio septiferis. Herbæ *Africanæ, Asiaticæ, vel Americanæ, sæpius scabræ, siccitate nigricantes.* Folia *inferiora opposita, suprema alterna, infima latiora sæpe dentata, superiora angustiora remota plerumque integerrima ; floralia bracteæformia, sæpissime calyce breviora.* Flores *solitarii, sessiles, bibracteati, in spicam terminalem dispositi.*

* *Spica rara vel densa, non imbricata.*

Obs. The species of this division, with the exception of the *B. juncea* distinguished by its peculiar habit, *B. hispida* by its long hairs, and *B. macrantha* by its flowers, are all so much alike, and run into one another by a series of characters so minute or vague, that, had I been better acquainted with the American species and possessed more numerous specimens, I should have been much disposed to have considered them as mere varieties of each other.

1. *B. juncea* (Cham. et Schlecht. Linnæa, 2. 590) caule simplici junceo foliis quadrifariis adpressis vestito, panicula brevi contracta terminali.

Hab. Tropical Brazil. *Sello.*

2. *B. palustris* (Spreng. Syst. 2. 805), scabra, subglabra, caule tenui subramoso, foliis anguste linearibus integerrimis vel infimis parvis obovatis, spica laxa pauciflora, bracteis lanceolato-linearibus, corollæ tubo calyce subduplo longiore, calyce fructifero recto.

Piripea palustris. *Aubl. Pl. Guian.* 2. 628. *t.* 253.

Hab. Guiana. *Aublet, Leprieur,* (*v. s.*)

3. *B. elongata* (Sw. Fl. Ind. Occ. 2. 1061), strigoso-scabra, caule subsimplici basi folioso, foliis oblongis integerrimis, superioribus linearibus, spica laxa pauciflora, corollæ tubo calyce subduplo longiore, calyce fructifero recto.

β. pilosa. *Schlecht. Linnæa,* 8. 245.

Hab. Central and South America: Jamaica, *Masson ;* Carolina, *Beyrich ;* Mexico *Schiede and Deppe ;* Brazil, *Sello ;* Rio Grande, *Tweedie.* (*v. s.*)

4. *B. tenella* (Br. Prod. 293), scabra, subglabra, caule tenui subramoso, foliis anguste linearibus integerrimis, spicis laxiusculis, bracteis ovato-lanceolatis ciliatis, corollæ parvæ tubo gracili calyce subduplo longiore, calyce fructifero vix incurvo.

Hab. Australia: North coast, *Brown, A. Cunningham.* (*v. s.*)

In Mr. Brown's specimens the calyx is slightly pubescent, in Mr. Cunningham's it is glabrous and the flowers are more numerous.

5. *B. linearis* (Br. Prod. 293), scabra, foliis oblongis, superioribus linearibus obtusis integerrimis, spica rara, bracteis inferioribus linearibus superioribus ovato-lanceolatis, calycibus pubescentibus vix incurvis, corollæ tubo breviter exserto.

Hab. Australia: Carpentaria, *Br.* (*v. s.*)

6. *B. pubescens*, scabra, foliis inferioribus oblongis superioribus linearibus omnibus integerrimis obtusis, spicis multifloris, bracteis ovato-lanceolatis subciliatis, calycibus pubescentibus subincurvis fructiferis ore obliquis, corollæ tubo breviter exserto.

Hab. Australia: Marshy lands on the Endeavour River, North coast, *A. Cunningham.* (*v. s.*)

7. *B. ramosissima* (Br. Prod. 295.)

scabra, ramosa, foliis rameis integerrimis lineari-lanceolatis, spicis elongatis multifloris, bracteis ovato-lanceolatis subciliatis, corollæ tubo calyce florifero incurvo plus dimidio longiore apice piloso-hispido, calyce fructifero rectiusculo.

HAB. Australia: East coast (Thirsty Sound), *R. Brown*; York Sound North coast, *A. Cunningham*. (*v. s.*)

8. *B. dura*, glabra vel basi hispidula, caule subramoso foliis infimis obovatis superioribus oblongis integerrimis supremis linearibus, spica apice condensata multiflora, bracteis ovato-lanceolatis subciliatis, corollæ tubo exserto, capsula calycem fructiferum rectum subæquante.

HAB. Extratropical South Africa: Eastern districts, Uitenhage, Cafferland, *Ecklon*, *Drège*. (*v. s.*)

9. *B. glabrata*, glabra vel basi vix hispidula, caulibus erectis subsimplicibus, foliis inferioribus late obovatis superioribus linearibus oblongisve, spica condensata brevi, bracteis ovato-lanceolatis, corollæ tubo exserto, capsula calyce recto dimidio longiore.

HAB. Extratropical South Africa: *Herb. Hooker*; Cape district near Rondebosch, *Ecklon*. Katberg, *Drège?*. (*v. s.*)

10. *B. gracilis* (Br. Prod. 293), caule simplici glabro, foliis inferioribus obovatis superioribus oblongis omnibus obtusis integris, spica rara, bracteis ciliatis calyce dimidio brevioribus, capsulæ apice exserto.

HAB. Australia, near Port Jackson, *R. Brown*. (*v. s.*)

11. *B. asperata* (Br. Prod. 294), scaberrima, foliis inferioribus lanceolato-oblongis paucidentatis, superioribus lineari-lanceolatis integerrimis, bracteis lanceolato-ovatis calyce duplo brevioribus, calycibus fructiferis apice obliquis, capsulis inclusis. β angustifolia.

HAB. Australia: North coast, *R. Brown*, β. Goulburn Island, *A. Cunningham*. (*v. s.*)

12. *B. urticæfolia* (Br. Prod. 293), scabra, glabriuscula vel pubescens, foliis infimis approximatis oblongis obtusis mediisque dentatis lanceolatis distantibus, spica laxa, bracteis lanceolatis ciliatis calyce brevioribus, corollæ tubo calyce subduplo longiore, capsulæ apice exserto.

HAB. Australia: Port Curtis, East coast, *R. Brown*. (*v. s.*)

13. *B. hispida* (Hamilt. in Don. Prod. Fl. Nep. 91.), pilis longis hispida, subsimplex, basi foliosa, foliis oblongis subdentatis, superioribus linearibus, spica laxa multiflora, corollæ tubo vix exserto.

HAB. Gambia, *Herb. Hooker*. Mountains of East India, *Wallich*, *Royle*, *&c.*, (*v. s.*)

14. *B. Americana* (Linn. Spec. 879), piloso-hispida, scaberrima vel demum glabrata, caule subsimplici basi folioso, foliis oblongis lanceolatisve subdentatis, superioribus linearibus, spica laxiuscula, corollæ tubo calyce subduplo longiore, calyce fructifero recto.

HAB. North America: Southern States to Saint Louis, *Drummond*; Mexico and Panama. (*v. s.*)

The specimens from each locality in the United States differ from each other almost as much as the so called species of South America and other countries, but it would require much better materials than I possess to determine the value of these differences.

15. *B. macrantha*, pubescenti-scabra, foliis lanceolatis subdentatis remotis, spica laxiuscula, corollæ tubo hirsuto calyce quintuplo longiore.

HAB. Sierra Leone. *Herb. Banks*. (*v.s.*)

Habit nearly that of *B. americana*, but very different in its flowers. Calyx covered with glutinous hairs. Corolla above an inch long, lobes of the limb large and broad.

Obs. I have not seen the eleven following species but they are all said to be scarcely distinguishable from *B. elongata*, and probably form one species with that and *B. americana*.

16. *B. pusilla* (Humb. et Kunth, Nov. Gen. et Sp. Am. 2. 340.) "hispido-scabra, caule subsimplici teretiusculo, foliis suboppositis inferioribus obovatis oblongis superioribus linearibus integerrimis uninerviis, spica solitaria, calyce tubo corollæ breviore et capsulam superante."

HAB. New Granada. *Humboldt.*

17. *B. disticha* (Humb. et Kunth, l. c.), "hispido-scabra, caule ramoso subtetragono, foliis suboppositis linearibus integerrimus uninerviis, spica solitaria disticha, calyce tubum corollæ æquante."

HAB. Santa Fè de Bogota? *Humboldt.*

18. *B. longifolia* (Humb. et Kunth, l. c.) "glabriuscula, caule ramoso tereti scabriusculo, foliis inferioribus oppositis anguste linearibus elongatis integerrimis trinerviis calloso-exasperatis, spica solitaria, calyce tubo corollæ breviore."

HAB. With the preceding one, *Humboldt.*

19. *B. lithospermifolia* (Humb. et Kunth, l. c. 341), "hispido-scabra, caule simplici teretiusculo superne subtrigono, foliis inferioribus suboppositis linearibus subintegerrimis trinerviis, spicis solitariis, calyce corolla triplo breviore capsulam subæquante."

HAB. On the Magdalen and in the plains of Bogota, *Humboldt.*

20. *B. ternifolia* (Humb. et Kunth, l. c.) "hispido-scabra, caule simplici trigono, foliis inferioribus ternis lanceolato-linearibus apicem versus remote serratis trinerviis, spica solitaria, tubo corollæ calycem paulo superante."

HAB. With the preceding species? *Humboldt.*

21. *B. virgata* (Humboldt et Kunth, l. c. 342), "hispido-scabra, caule basi ramoso, ramis virgatis subtetragonis, foliis oppositis lanceolato-linearibus integerrimis trinerviis, spicis paniculatis, calyce tubo corollæ dimidio breviore capsulam duplo superante."

HAB. New Andalusia, *Humboldt.*

22. *B. rosea* (Humb. et Kunth, l. c.), "hispido-scabra, caulibus subcæspitosis simplicibus teretiusculis, foliis inferioribus oppositis lanceolatis obtusiusculis apice subdentatis trinerviis, spicis compluribus congestis."

HAB. Caraccas, *Humboldt.*

23. *B. macrocarpa* (Humb. et Kunth, l. c.), "hispido-scabra, caule simplici teretiusculo, foliis inferioribus oppositis lanceolatis acutis basi angustatis apicem versus remote dentatis, spica solitaria, calyce tubo corollæ capsulaque breviore."

HAB. New Andalusia? *Humboldt.*

24. *B. amethystina* (Cham. et Schlecht. Linnæa, 2. 588.), "caule simplici inferne folioso, spica laxa pauciflora, bractea externa ovata acuta, calycis dentibus brevibus subæqualibus."

HAB. Tropical Brazil, *Sello.*

25. *B. lobelioides,* (Cham. et Schlecht. l. c. 589,) "caule simplici inferne folioso, spica laxa multiflora, bractea externa lanceolata acutissima, calycis dentibus inæqualibus, anticis duobus majoribus."

HAB. Tropical Brazil, *Sello.*

26. *B. lavandulacea* (Cham. et Schlecht. l. c.), "caule simplici inferne folioso, foliis integerrimis subplicato-nervosis, spica densiflora."

HAB. Tropical Brazil, *Sello.*

** *Spica densa, imbricata, tetragona.*

27. *B. stricta,* glabriuscula, foliis linearibus erectis strictis, spica tetragona imbricata subglabra, bracteis ovato-lanceolatis acutis nudis calycem æquantibus.

HAB. China, *Lord Mulgrave, in Herb. Banks.* (*v. s.*)

This species has not the large lower leaves of the three following; the stem is simple, about eight or nine inches high.

28. *B. cruciata* (Hamilt. in Don. Prod. Fl. Nep. 91.), pubescens, foliis radicalibus obovatis, caulinis inferioribus oblongis superioribus linearibus, spica tetragona imbricata pubescente, bracteis ovatis ciliatis calyce brevioribus.

HAB. Mountains of Nepal and Prome, *Wallich.* (*v. s.*)

Stem and leaves of *B. hispida.* Spike conical scarcely an inch long, at the maturity of the fruit about four or five lines in diameter. Calyx nearly cylindrical.

29. *B. tetrasticha* (Wall. — Benth. Scroph. Ind. 41.) pubescens vel glabriuscula, elata, foliis oblongis lanceolatisve obtusis integerrimis, spica tetragona imbricata villosa, bracteis lato-ovatis calycem æquantibus.

HAB. Burma, *Wallich.* (*v. s.*)

Stems two feet high. Leaves numerous. Spikes two inches long very densely imbricated, when in fruit seven or eight lines in diameter. Calyx very much depressed.

30. *B. tetragona* (Br. Prod. 293.), glabra, elata, foliis oblongis lanceolatisve paucidentatis, spica tetragona imbricata glabra, bracteis lato-ovatis calycem superantibus.

Hab. Australia: North coast, *R. Brown;* Goulburn Island, *A. Cunningham. (v. s.)*

Differs from *B. tetrasticha* (besides its smoothness) in the spike much less densely imbricate, and the leaves more distant on the stem.

III. Rhamphicarpa.

Calyx campanulatus, quinquefidus. *Corolla* tubo tenui longe exserto, limbo patente 5-partito, laciniis obovatis subæqualibus. *Stamina* didynama, tubo inclusa. *Capsula* oblique mucronata vel rostrata, valvulis coriaceis integris. Herbæ *erectæ ramosæ, siccitate nigricantes, glabræ.* Folia *inferiora opposita, superiora alterna, angusta, integra vel pinnatisecta.* Flores *breviter pedunculati, racemosi, sæpius ebracteati.*

1. *R. longiflora,* foliis pinnatisectis anguste linearibus, corollæ tubo recto limbo pluries longiore, capsulæ rostro subrecurvo.

Buchnera longiflora, *Wight, MSS.*

Hab. Senegal (Isle of St. Louis), *Leprieur.* East Indian Peninsula, *Wight.* Mountains of North India, *Jaquemont. (v. s.)*

A small erect annual, very branchy, glabrous. Segments of the leaves few and distant, smooth. Peduncles usually shorter than the calyx and naked, sometimes longer with a pair of bractes. Calyx deeply cleft, with long subulate segments, lanceolate at the base. Corolla white (drying bluish), tube an inch and a half long, lobes of the limb short, broad, truncate or emarginate.

2. *R. tubulosa,* foliis lanceolato-linearibus, integris, corollæ limbo tubo subincurvo parum breviore, capsulis truncatis rostro brevi.

Gerardia tubulosa, *Linn. Suppl.* 279.

Hab. Extratropical South Africa: Eastern portion of the Uitenhage district, *Ecklon, Drège, &c. (v. s.)*

Whole plant glabrous. Stems erect a foot or more high, but little branched, smooth. Leaves smooth or slightly rough, narrowed at both ends, nearly all opposite. Peduncles rather longer than the calyx. Corolla white, drying bluish; tube an inch long, slightly curved about the middle, lobes of the limb entire, obovate. Divisions of the calyx lanceolate about as long as the tube.

3. *R. curviflora,* foliis lanceolato-linearibus integris, corollæ limbo tubo incurvo vix breviore, capsulis acinaciformibus.

Hab. Madagascar and Mozambique, *Forbes. (v. s.)*

Habit of *R. tubulosa.* Leaves narrower, divisions of the calyx longer, tube of the corolla more curved, with a larger limb. Capsule very oblique.

IV. Cycnium. *E. Meyer, MSS.*

Calyx basi bibracteatus, longe tubulosus, apice 5-fidus. *Corollæ* tubo cylindrico recto, limbo patente profunde 5-fido laciniis ovatis integris. *Stamina* tubo inclusa didynama. *Capsula* carnosa, indehiscens(?) —Herbæ *Austro-Africanæ rigidæ scabræ siccitate nigricantes.* Folia *opposita vel superiora alterna, grosse dentata.* Flores *axillares vel racemosi.*

1 *C. adonense* (E. Meyer, MSS.), caule procumbente, foliis ovatis oblongisve, floribus sessilibus axillaribus, corollæ tubo calyce plus duplo longiore.

Hab. Addo country, in the Uitenhage district, *Drège,* also in *Ecklon's* collection and the Linnæan Herbarium. *(v. s.)*

All covered with very rigid short hairs. Leaves sessile wedge-shaped at the base, Calyx above an inch long, open at the base as the capsule swells, divisions leafy three to four lines long. Corolla white, tube two and a half inches long, limb flat an inch and a half in diameter. Capsule oval, half an inch long, with very numerous seeds.

2. *C. racemosum,* caule erecto, foliis lanceolatis, floribus pedunculatis racemosis, corollæ tubo calycem vix æquante.

Hab. Near Siloh on the Klipplaat river, on the eastern side of the Witsenberg, in Tambukiland, *Ecklon. (v. s.)*

In habit somewhat resembling the *Me-*

lasma scabra, or *Rhamphicarpa tubulosa*. Stem a foot high, nearly simple, scabrous. Leaves 1½—2 inches long, with few teeth, contracted at the base, nearly all alternate. Pedicels short, bractes linear. Tube of the calyx 9—10 inches long, striated; lobes of the limb lanceolato-subulate. Limb of the corolla 1½ inch diameter. Anthers attached by their centre, pointed at the upper end. I have not seen the capsule, but from the appearance of the ovary it is probably fleshy.

V. NYCTERINIA. *Don.*

Erini sp., *Linn. et Auct.*

Calyx ovato-tubulosus, breviter 5-dentatus, bilabiatus vel bipartitus. *Corolla* persistens, tubo elongato basi demum fisso, fauce æquali sæpe hispida, limbo patente subæqualiter 5-partito, laciniis bifidis integrisve. *Stamina* didynama, superiora tubo inclusa antheris oblongis erectis, inferiora ad faucem inserta antheris minoribus transversis sæpe sterilibus, nunc omnino abortiva. *Capsula* coriacea vel membranacea valvulis apice bifidis. Herbæ suffruticesve *Austro-Africana plus minusve viscosa siccitate sæpe nigricantia.* Folia *infima opposita, superiora alterna sæpius paucidentata, floralia sæpius minora integra calyce adpressa vel interdum adnata.* Flores *sessiles interrupte vel dense spicati.*

* *Corollæ laciniæ bifidæ, tubus tenuiter pubescens. Folia oblonga linearia vel lanceolata.*

1. *N. coriacea*, suffruticosa, foliis floralibus late lanceolatis obtusis dentatis crassis coriaceis villosis calyces coriaceos villosos duplo superantibus, spica elongata.

HAB. Mountains near Cape Town, *Ecklon.* (*v. s.*)

Although the single specimen I have seen is but imperfect, yet it is evidently a very distinct species. In habit it comes near *N. divaricata* but is much larger and more rigid, and has the flowers of *N. spathacea.* Capsule larger than in any other species, and almost woody.

2. *N. spathacea*, suffruticosa, erecta, foliis obovato- vel oblongo-spathulatis infimis trinerviis, floralibus amplexicaulibus late lanceolatis oblongisve obtusis subintegerrimis uninerviis, omnibus coriaceis margine et ad nervos pubescentibus cæterum glabris, spica elongata, calycibus elongatis folio florali parum brevioribus.

HAB. Tambukiland near Silo East of the Winterberg and on the Katriviersberg, *Ecklon.* At the top of the Witberg, *Drège.*(*v.s.*)

Branches simple about a foot high, rigid, Floral leaves spathiform, near an inch long, and apparently coloured, but drying black like the rest of the plant. Spike much lengthened after flowering. Tube of the corolla above an inch and a half long.

3. *N. maritima*, suffruticosa erecta subglabra, foliis lanceolatis oblongisve obtusis subintegerrimis, floralibus late lanceolatis calyce parum superantibus omnibus subcoriaceis glabris, spica elongata densa multiflora.

Erinus maritimus, *Linn.—Thunb. Fl. Cap.* 474.

HAB. Uitenhage district. Sea coast near Zeekoe river *Thunb.*, near Kachu, *Drège.* (*v. s.*)

Near *N. spathacea* but taller. The leaves of the central stem are numerous and close and the spike long and thick. The lateral branches, when they exist, are more slender, with few leaves and flowers. This may possibly be a mere variety of *N. lychnidea.*

4. *N. lychnidea* (Don. in Sw. Brit. Fl. Gard. 2nd Ser. 3. t. 239.), suffruticosa, ramis adpresse villosis, foliis oblongo-linearibus paucidentatis integerrimisque uninerviis glabriusculis, floralibus amplexicaulibus late lanceolatis oblongisve obtusis paucidentatis integerrimisque, margine nervisque ciliatis, spica elongata, calycibus folio florali brevioribus.

Erinus lychnidea, *Linn. Suppl.* 287? *Willd. Spec.* 3. 333, *non Thunb.—Bot. Mag.* 51, *t.* 2504.—*Bot. Reg.* 9. *t.* 748.

HAB. Probably along the sea coast: in Ecklon's, Forbes's, and other collections. In the Amaponda country between the rivers Umtenda and Umzimcoolu, *Drège.* (*v. s.*)

Branches usually decumbent at the base. Leaves more or less fleshy, the larger ones almost always toothed. Drège's specimens have the leaves rather less toothed, but in other respects resemble the *N. lychnidea,* though gathered so far to the eastward.

The *Erinus lychnidea, Linn.* has been referred to the *Lyperia fragrans,* on account of the figure of Burmamn quoted by him, but his phrase applies rather to this plant.

5. *N. capensis,* herbacea, dura, caule erecto adpresse villoso, foliis inferioribus lanceolatis, superioribus vel omnibus linearibus paucidentatis integerrimisve uninerviis, margine nervoque plerumque ciliatis, floralibus oblongo-lanceolatis integerrimis calyces vix superantibus, spica oblonga.

Erinus capensis. *Linn. Mant.* 252.

Erinus æthiopicus. *Thunb. Fl. Cap.* 473.

α. *hirsuta,* ramis villosioribus, foliis utrinque hirsutis.

β. *glabriuscula.*

γ. *foliosa,* foliis minoribus crebris, spica pauciflora.

δ. *tenuifolia,* foliis anguste linearibus glabrioribus.

Hab. Hills and plains from the Cape to Fort Beaufort in the Neutral territory, *Ecklon, Drège, &c.,* also northward in Namaqualand and New Hantam, *Drège (v.s.)*

Apparently a common species, chiefly distinguished from *N. lychnidea* by its herbaceous probably annual root, upright stems, and smaller leaves. Spikes usually short and few flowered, occasionally however the central one acquires a considerable length. Corolla slender, scarcely an inch and a quarter long.

6. *N. longiflora,* herbacea, caule adpresse piloso, foliis linearibus pinnatifido-dentatis, floralibus lanceolatis dentatis sub-viscoso-pubescentibus, spica brevi.

Hab. Kamiesbergen in the North of Clanwilliam district, *Drège. (v. s.)*

Differs from *N. capensis* by its deeply toothed leaves, from *N. dentata* by their narrowness, from both by the corolla eighteen to twenty lines long.

7. *N. dentata,* herbacea, erecta, caule adpresse piloso, foliis oblongo-lanceolatis ellipticisve basi angustatis grosse dentatis semipinnatifidisve floralibusque lato-lanceolatis viscoso-pubescentibus, spica brevi densa.

β *humilis.*

Hab. Mountains near Cape Town and Paarl, *Ecklon, Drège, &c.* β. on the Zwarteberg, *Ecklon,* and Nieuweveld mountains, *Drège. (v. s.)*

Habit of *N. capensis* but distinct by its broad deeply-toothed leaves, often narrowed into a petiole at the base.

8. *N. ovata,* suffruticosa?, divaricata vel procumbens, viscoso-villosa, foliis ovatis grosse dentatis floralibusque oblongis utrinque villosis, spica brevi.

Hab. Witbergen in Cafferland, *Drège.*

Leaves very obtuse, narrowed at the base, spike apparently interrupted. Corolla an inch and a half long. A very distinct species, but of which the specimens are imperfect.

9. *N. pumila,* humilis, ramosissima, foliis oblongo-linearibus profunde et remote dentatis, floralibus conformibus calycibus duplo terve longioribus basi subdilatatis, floribus axillaribus vix spicatis, corollæ tubo vix pubescente, capsulis ovatis coriaceis.

Hab. In the Nieuweveld or Kowp, *Drège. (v. s.)*

A remarkable species with somewhat the appearance of *Castilleja fissifolia,* scarcely three inches high, drying black like the other species of the first section.

** *Corollæ laciniæ bifidæ, tubus glaber. Folia spathulata.*

10. *N. selaginoides,* humilis, basi ramosa, foliis spathulatis floralibus basi dilatatis, corollæ fauce pilis rigidis coronata, staminibus inferioribus abortivis.

Erinus selaginoides, *Thunb. Fl. Cap.* 475.

Erinus africanus, *Herb. Un. Itin.* 301. *non Linn.*

α. *villosa.*

β. *glabra.*

γ. *parviflora.*

Hab. Sandy plains on the West coast from the Cape Flats northward, *Ecklon, Drège, &c.* β. on the Olifants and Zwartdoorn rivers, *Drège.* γ. in *Ecklon's* collection without the locality. *(v. s.)*

A low annual, generally three to five inches high, usually covered with spreading viscous hairs, and dries less black than the species of the first section. Lower leaves obovate, upper ones oblong or linear-spathulate, entire or with very few teeth. Floral leaves adhering at the base to the calyx, spreading at the top. Flowers rather distant especially at the base of the spike.

Calyx and capsules membranous. Corolla nine to eleven lines long, or in the var. β. scarcely five lines long and concealed under the floral leaves. As there is but a single small specimen of this variety, I am unable to say whether the small size of the flower is accidental or the character of a species.

11. *N. Africana,* (Don. in Sw. Br. Fl. Gard. 2nd Ser. 3. sub. t. 239.) humilis, basi ramosa, foliis obovatis, floralibus oblongo-spathulatis, corollæ fauce vix pilosa, staminibus 4 antheriferis.

Erinus africanus, *Linn.—Thunb. Fl. Cap.* 474.

HAB. Carro and Carroid districts: Hex river, *Drège.* Winterbergen and Sneeuwebergen, *Ecklon, Drège.* Hermanns Kraal, in Albany, *Ecklon.* (*v. s.*)

Habit of *N. selaginoides.* Leaves rather more collected at the base of the stem, spike more dense with the floral leaves more prominent, and readily distinguished by the two lower anthers slightly projecting from the mouth of the tube.

*** *Corollæ limbi laciniæ integræ, tubo glabro.*

12. *N. divaricata,* humilis, rigida, basi ramosa, pubescenti-hirta, foliis infimis longe petiolatis obovatis, superioribus floralibusque lanceolatis dentatis, spicis elongatis.

Manulea divaricata, *Thunb. Fl. Cap.* 468.

HAB. Sandy hills and plains near Cape Town, *Thunb. Ecklon, Drège, &c.* (*v. s.*)

A common plant in collections, drying black. Corolla slender, about ten lines long. Capsules rather coriaceous.

13. *N. peduncularis,* humilis, basi foliosa ramosa, foliis infimis petiolatis ovatis, caulinis paucis lanceolatis subdentatis, spicis longe pedunculatis capitulæformibus paucifloris.

α. *hirsuta*

β. *glabriuscula.*

HAB. Theopolis in Albany, *Ecklon,* β. Haazenkraalsrivier, *Drège.* (*v. s.*)

Leaves nearly all collected at the base of the stem. Scapiform branches four to six inches long. Flowers of *N. divaricata.* Capsules somewhat coriaceous.

14. *N. pusilla,* erecta, subsimplex, foliis subradicalibus petiolatis late ovatis, floralibus oblongo-linearibus spathulatisve, floribus paucis distantibus vel subapproximatis.

HAB. Between Hol river and Micrenkasteel, in the North of Clanwilliam district, *Drège.* (*v. s.*)

A more slender plant than *N. peduncularis,* and branches not scapiform. Specimens in the Linnæan Herbarium, marked *Buchnera divaricata,* appear to belong to the species.

15. *N. villosa,* caule erecto ramoso folioso, foliis oblongo-linearibus obtusis subintegerrimis, spicis basi interruptis apice densis.

Erinus villosus, *Thunb. Fl. Cap.* 474?

HAB. Haazenkraalsrivier, *Drège.* (*v. s.*)

A taller plant than the three last, and scarcely blackens in drying. Capsules almost membranaceous. Stamens all antheriferous, and included in the tube, as in the three last species.

VI. POLYCARENA.

Calyx membranaceus, bilabiatus, fructifer bipartitus. *Corolla* persistens, tubo demum fisso, fauce latiore, limbo patente subæqualiter 5-fido. *Stamina* didynama, versus apicem tubi inserta, antheris consimilibus exsertis. *Capsula* membranacea. Herbæ *Austro-Africanæ, pusillæ, annuæ, plerumque ramosissimæ, plus minusve viscosæ, siccitate vix nigricantes.* Spicæ *terminales, floriferæ sæpe capitatæ, fructiferæ interdum elongatæ.* Flores *subsessiles.* Folia floralia *pedicello brevissimo adnata.*

* *Corollæ tubus calyce* 2—3-*plove longior.*

1. *P. capensis,* viscoso-pubescens, foliis linearibus oblongisve integris paucidentatisque, spicis laxiusculis numerosis corymboso-paniculatis, corollæ tubo calyce triplo longiore.

Buchnera capensis, *Linn. Mant.* 88.

Manulea capensis, *Thunb. Fl. Cap.* 467.

HAB. Cape district, *Ecklon, Drège,* &c. (*v. s.*)

A pretty annual, about six inches high, with numerous yellow flowers. Tube of the corolla half an inch long, limb larger than in any of the preceding ones. Capsule membranaceous. Two at least, and generally all four anthers slightly exserted.

2. *P. gilioides*, viscoso-pubescens, foliis linearibus subdentatis, floralibus calyces æquantibus, spicis pubescentibus paucifloris, corollæ tubo calyce duplo longiore.

HAB. Sands near Paarl, *Drège*. (*v. s.*) Habit nearly that of *Gilia laciniata*, much more slender than that of *P. capensis*, with flowers scarcely half the size. A specimen, marked *Buchnera capensis*, β. in the Banksian Herbarium, appears to be this species.

** *Corollæ tubus calyce subbrevior.*

3. *P. aurea*, viscoso-pubescens, foliis linearibus integerrimis subdentatisve, floralibus lineari-lanceolatis calyces æquantibus, spicis brevibus densis pubescentibus, corollæ limbo tubo suo longiore.

Buchnera aurea, *Herb. Banks. MSS.*

Manulea Æthiopica, *Thunb. Fl. Cap.* 467? *excl. Syn. Linn.*

HAB. Cape of Good Hope, *Thom. in Herb. Hooker*, *Masson in Herb. Banks.* (*v. s.*)

Differs from *P. pubescens* in its narrow, short, erect leaves, and especially in the flowers, which are above twice as large.

4. *P. pubescens*, erecta, pusilla, viscosa, foliis inferioribus subovatis superioribus oblongis linearibusve integerrimis dentatisque, floralibus ovatis lanceolatisve flores subæquantibus, bracteis capsulisque pubescentibus, corollæ limbo tubo suo subæquilongo.

HAB. Roodesand, Haazenkraalsrivier, and Zilverfontein, in Namaqualand, *Drège*. (*v. s.*)

Varies in the leaves entire or toothed. Spike short and dense.

5. *P. capillaris*, glabriuscula, foliis infimis obovatis oblongisve rameis linearibus, floralibus linearibus obtusis calycem æquantibus capsulisque glabris, spicis fructiferis laxis.

Manulea capillaris, *Linn.—Thunb. Fl. Cap.* 468.

HAB. Cape Flats and Zwarteland, *Ecklon, Drège.* &c. (*v. s.*)

Six inches high. Branches numerous, very slightly pubescent. Calyx about a line long. Capsule and ripe calyx longer. Flowers small, yellow. Some of Ecklon's specimens correspond exactly with Thunberg's description, others, as also Drège's, are more luxuriant, with the flowers more distant.

6. *P. rariflora*, tenuiter pubescens, foliis anguste linearibus subintegerrimis vel infimis oblongis, floralibus flores superantibus, spicis raris paucifloris subglabris, corollæ limbo tubo suo breviore.

HAB. In Ecklon's collection, without a precise locality. (*v. s.*)

Near *P. capillaris*, but leaves narrower, and flowers much smaller. Four to six inches high, erect, and much branched.

7. *P. plantaginea*, erecta, pusilla, viscoso-pubescens, foliis inferioribus obovatis superioribus oblongis integerrimis paucidentatisque, floralibus lanceolatis obtusis calyces superantibus, corollæ minimæ limbo tubo suo breviore.

Manulea plantaginea, *Linn.!—Thunb. Fl. Cap.* 469.

HAB. In rocks at Modderfontein and Zilverfontein in Namaqualand, *Drège*. (*v. s.*)

Spikes forming small leafy heads with a few detached axillary flowers lower down the stem. The whole plant is often not two inches high, and the flowers the least of all the Buchnereæ.

8. *P. intertexta*, procumbens, viscoso-pubescens, foliis petiolatis parvis ovatis dentatis pubescentibus, floralibus ovato-oblongis obtusis calyces vix superantibus, spicis globoso-capitatis subfastigiatis.

Manulea intertexta, *Herb. Banks. MSS.*

HAB. Cape of Good Hope, *Masson*. (*v. s.*)

Flowers very small. Leaves deeper toothed than in the other species.

VII. PHYLLOPODIUM.

Calyx subæqualiter 5-partitus, laciniis basi margine membranaceo subconnatis. *Corolla* infundibuliformis, tubo calyce breviore, limbo 5-partito, laciniis integris subæqualibus. *Stamina* didynama, exserta, antheris inter se consimilibus. *Capsula* membranacea. Herbæ *Austro-Africanæ, annuæ, duræ, plerumque basi procumbentes, rarius erectæ, siccitate sæpe nigricantes.* Folia floralia *pedicello brevissimo adnata.* Flores *parvæ, sessiles, aurantiaci*

vel sæpius cærulescentes vel purpurascentes? Spicæ *terminales, sæpe capitatæ, fructiferæ plus minusve elongatæ.*

1. *P. cuneifolium,* caule pubescenti-hirto, foliis inferioribus petiolatis ovatis obovatisve inciso-dentatis, superioribus oblongo-cuneatis, floralibus vix calyces superantibus, spicis floriferis capitatis, fructiferis oblongo-cylindricis densis multifloris.

Manulea cuneifolia, *Linn.!—Thunb. Fl. Cap.* 468.

Hab. Uitenhage district, about Algoa Bay, *Herb. Hooker, Ecklon,* &c. (*v. s.*)

Stems, though annual, almost of a woody texture. Leaves thickish, glabrous. Divisions of the calyx joined to the middle by a membrane. Habit of a *Selago.*

2. *P. capitatum,* caule hirto, foliis ovato-lanceolatis oblongisve hirtis, superioribus parvis linearibus, floralibus ovato-lanceolatis hirtis extimis calyces superantibus, spicis capitatis subglobosis vel demum oblongis densis multifloris.

Manulea capitata, *Linn.—Thunb. Fl. Cap.* 469.

Hab. Western districts: from Cape Town to Olifantsrivier in Clanwilliam, *Thunberg, Ecklon, Drège,* &c. (*v. s.*)

More hairy and less branching at the summit than *P. cuneifolium.* Leaves narrower, less toothed. Spikes very dense, and scarcely bigger than a large pea. External floral leaves forming a sort of involucre to the young heads. Divisions of the calyx obtuse, deeply cleft. Corolla minute.

3. *P. heterophyllum,* pusillum, hirtum, basi ramosum, ramis erectis, foliis infimis petiolatis ovatis subdentatis, superioribus paucis linearibus, floralibus lineari-lanceolatis, extimis calyces ciliatos superantibus, spicis capitatis fructiferis oblongis laxiusculis, staminibus limbo corollæ brevioribus.

Manulea heterophylla, *Linn.—Thunb. Fl. Cap.* 469.

Hab. Near the Cape, from Zwarteland to Caledon, *Thunberg, Ecklon, Drège,* &c. (*v. s.*)

Perhaps a variety of *P. capitatum,* but much more slender, scarcely ever six inches high, with looser heads of flowers. Corolla apparently yellow.

4. *P. pumilum,* erectum, glabriusculum, foliis petiolatis ovatis, superioribus oblongis, floralibus ovatis obtusissimis pubescentibus calycem æquantibus, spicis capitatis paucifloris, staminibus limbum corollæ æquantibus.

Hab. Groen river in Clanwilliam, *Drège.* (*v. s.*)

Slenderer still than the last, with smaller heads and rather larger flowers.

5. *P. diffusum,* glabriusculum vel vix hirtum, ramosissimum, foliis ovatis oblongisve dentatis basi in petiolum longe angustatis, floralibus linearibus calyces vix superantibus, spicis elongatis laxis.

Hab. Near Uitenhage, *Ecklon.* (*v. s.*)

Branches half a foot to near a foot long, procumbent. Flowering-spike lax, fruit-spike near two inches long, the capsules about a line distant from each other. Flowers not so minute as in the other species.

6. *P. bracteatum,* ramosissimum, diffusum, ramis pubescentibus, foliis petiolatis ovatis dentatis glabris, floralibus conformibus, spicis longis floribus omnibus remotis, calycibus petiolo foliorum floralium vix longioribus.

Hab. Uitenhage district, near Addo and Enon, *Drège,* Olifantshoek, *Ecklon.* (*v. s.*)

Remarkable for its long lax branches, and especially for the broadly-expanded limb of the floral leaves.

VIII. Sphenandra. *Benth.*

Calyx 5-partitus. *Corolla* decidua tubo brevissimo, limbo rotato, laciniis 5 rotundatis subæqualibus. *Stamina* 4, exserta, subadscendentia; antheris cuneatis consimilibus.

1. *S. viscosa* (Benth. in Lindl. Nat. Syst. of Bot. 445.).

Buchnera viscosa, *Ait. Hort. Kew. ed.* 1. *v.* 2. *p.* 357.—*Bot. Mag.* 7. 217.

Manulea viscosa, *Willd. Enum. Hort. Berol.* 652.

Manulea cærulea, *Thunb. Fl. Cap.* 467, *vix. Linn.*

Hab. Carro desert and carroid districts. Common in Cape collections. (*v. s.*)

Suffrutex erectus, pedalis, viscoso-pubescens. Folia pleraque opposita oblongo-

lanceolata, paucidentata, floralia pedicello multo breviora, libera, ovata, integerrima acutissima. Calyces hispidi laciniis lanceolatis. Staminum paria subæqualia.

IX. CHÆNOSTOMA.

Calyx 5-partitus. *Corolla* decidua infundibuliformis vel hypocrateriformis, rarius tubo brevissimo subcampanulata, fauce dilatata, limbo subæqualiter 5-fido, laciniis obovatis rotundatisve. *Stamina* didynama, antheris consimilibus, faucem æquantibus vel exsertis. Herbæ, suffruticesve *Austro-Africana*. Folia *fere omnia opposita dentata vel rarius integerrima, floralia conformia vel bracteæformia a pedicello libera*. Flores *axillares vel racemosi longiuscule pedicellati siccitate non nigricantes*. Capsulæ *glabræ*.

* *Corollæ tubus vix exsertus vel calyce brevior.*

1. *C. rotundifolium*, suffruticosum, glabriusculum, foliis parvis petiolatis obovato-rotundatis inciso-dentatis utrinque viridibus crassiusculis, pedicellis axillaribus calyce glabro parum longioribus, corollæ infundibuliformis tubo calyce breviore.

HAB. *Drège's* collection without a special locality. (*v. s.*)

Branches apparently procumbent. Limb of the leaves scarcely two to three lines long, petiole about two lines. Flowers few, small, axillary towards the summit of the branches.

2. *C. pauciflorum*, suffruticosum, pubescens, foliis petiolatis obovato-rotundatis dentatis utrinque pubescentibus pedicellis axillaribus calyce hispido sublongioribus, corollæ infundibuliformis tubo calyce breviore.

HAB. Nieuweveldsbergen in Beaufort, *Drège*, Krakakamma in Uitenhage, *Ecklon*. (*v. s.*)

Near *C. rotundifolium*, but flowers at least twice the size. Drège's specimens are more hairy than Ecklon's.

3. *C. campanulatum*, suffruticosum, villosum, foliis ovatis, dentatis, racemis laxis multifloris, calycis hispidi laciniis lineari-lanceolatis, corolla tubo brevissimo subcampanulata calyce subduplo longiore.

HAB Zuurebergen and Zwartehoogden in Uitenhage and Albany, *Ecklon*, *Drège*, on the Key river in Tambukiland, *Ecklon*. (*v. s.*)

Leaves about half an inch long, generally irregularly toothed and contracted at the base. Stamens very unequal in length, the longer pair rather shorter than the corolla, which appears to be blue. Ecklon's specimens are imperfect, but appear to belong to this species.

4. *C. calycinum*, suffruticosum, glabriusculum, foliis oblongo-lanceolatis dentatis glabris vel subtus canescentibus, calycis glabriusculi laciniis subulatis corolla subcampanulata vix dimidio brevioribus.

β. laxiflora.

HAB. In the Amakosa country between the rivers Gehau and Bashe, *Drège*, *β.* on the river Bashe and Windvogelberg, *Drège*. (*v. s.*)

Habit nearly that of *Sphenandra viscosa*, but more slender, and flowers more numerous. Corolla of *C. campanulatum*, but smaller. In the var. *β.* the calyx is much smaller, perhaps it may be a distinct species.

5. *C. procumbens*, suffruticosum, humile, ramosissimum, foliis ovali-oblongis subdentatis obtusis utrinque viridibus crassiusculis, racemis paucifloris, pedicellis calyce longioribus, corollæ infundibuliformis tubo calycem æquante vel vix superante.

HAB. On the Fish river, *Drège*. (*v. s.*)

Branches apparently prostrate, slightly pubescent towards the extremity, the calyx has also a few hairs, but the rest of the plant is quite glabrous.

6. *C. laxiflorum*, suffruticosum, procumbens, subcanescens, ramis adscendentibus fastigiatis, foliis oblongo-ovatis subdentatis basi longe angustatis planis, racemis laxis, floribus longe pedicellatis, calycibus glabris vel canescentibus, corollæ infundibuliformis tubo calycem æquante vel vix superante.

HAB. Near the Keiskamma, *Drège*. (*v. s.*)

It is possible this may be a mere variety of the last species, dependent on the soil in which it grew, but the flowers are larger and the appearance so different, that I have been unwilling to join them.

7. *C. halimifolium*, suffruticosum, humile, ramis numerosis erectis albidis, foliis ovali-oblongis lanceolatisve subdentatis utrinque incanis planis, racemis laxis, floribus longe pedicellatis, corollæ infundibuliformis tubo calycem æquante vel vix superante.

HAB. Karroo desert, near Graafreynet, *Ecklon*, Steelkloof, Hamerkuil and plains near Aasvogelberg, *Drège.* (*v. s.*)

Habit of *Manulea incana*, but a true *Chænostoma.* Branches thickly leaved at the base. Racemes almost leafless, the floral leaves being very small and entire.

8. *C. polyanthum*, herbaceum vel suffruticosum, basi ramosissimum, ramis apice pubescentibus paniculatis, foliis ovatis dentatis basi cuneatis, supremis oblongis, glabris vel subtus canescentibus, racemis laxis, calycibus hispidis, corollæ infundibuliformis tubo calycem vix superante.

HAB. On the Zwartkops river in Uitenhage, *Ecklon*, Algoa Bay? *Herb. Hooker.* (*v. s.*)

Habit and corolla of *C. laxiflorum.* Leaves and calyx of *C. campanulatum.*

9. *C. pumilum*, suffruticosum, multicaule, glabrum, foliis oblongis superioribus linearibus integerrimis paucidentatisque, floribus racemosis, corollæ infundibuliformis tubo calyce vix longiore.

HAB. In Uitenhage district, *Ecklon*; also in *Herb. Hooker* and in *Drège's* collection, probably from the neighbourhood of Algoa Bay.

Branches numerous, erect, three to four inches high. Leaves slightly revolute on the margin. Pedicels longer than calyx, which is nearly glabrous. Corolla very open, as in all the species of this section.

10. *C. denudatum*, suffruticosum, ramis glabris adscendentibus, foliis distantibus linearibus integerrimis margine revolutis glabris, racemis paucifloris, calyce hispido corollæ infundibuliformis tubo vix breviore.

HAB. Langekloof, in George district, *Ecklon, Drège.* (*v. s.*)

Habit nearly that of *Asperula cynanchica.* Calyx of *C. campanulatum.* Corolla of *C. pumilum.* Capsule oblong, longer than the calyx.

** *Corollæ tubus calyce bis terve longior.*

11. *C. revolutum*, suffruticosum, cinerascens vel pubescens, foliis linearibus integerrimis margine revolutis, floribus racemosis, pedicellis calyce vix longioribus, calycis laciniis linearibus subulatisve, capsulam ovatam subæquantibus, tubo corollæ bis terve brevioribus.

Manulea revoluta, *Thunb. Fl. Cap*, 467.

α. *glabriusculum.*

β. *pubescens.*

HAB. Under the Zwartebergen from the river Zondereinde to the Gauritz river, *Ecklon, Drège*, &c., and on the Fish river, *Dr. Gill.* β. on the Cedarbergen and near Boschkloof, *Drège.* (*v. s.*)

A foot high, very much branched.

12. *C. glabratum*, suffruticosum, glabrum, foliis linearibus integerrimis margine revolutis, floribus racemosis, pedicellis calyce plus duplo longioribus, calycis laciniis lanceolato-subulatis subpubescentibus capsula oblonga brevioribus, corollæ tubo calyce bis terve longiore.

HAB. Key river in Tambukiland, and Kannaland in Zwellendam, *Ecklon*; Zwaanepoolspoort and Kendo, *Drège.* (*v. s.*)

Differs from *C. linifolium* in its narrower leaves, longer capsules, and is almost always perfectly glabrous.

13. *C. linifolium*, suffruticosum, ramis apice hirtellis, foliis oblongis lanceolatis linearibusve integerrimis paucidentatisque margine subrevolutis hirtis glabriusculisve, floribus racemosis, pedicellis calyce plus duplo longioribus, calycis laciniis glabris vel vix hirtellis linearibus capsulam subsuperantibus corollæ tubo triplo brevioribus.

Manulea linifolia, *Thunb. Fl. Cap.* 466?

HAB. Mountains of Cape District, near Worcester, and near Brackfontein, in Clanwilliam, *Ecklon, Drège*, &c. (*v. s.*)

Intermediate between *C. glabratum* and *æthiopicum*, perhaps a variety of the latter.

14. *C. æthiopicum*, suffruticosum, ramis numerosis floriferis fastigiatis, foliis oblongis ovatisve paucidentatis glabriusculis, racemis brevis laxis subcorymbosis, calycibus hispidis corollæ tubo bis terve brevioribus.

Buchnera æthiopica, *Linn.! Mant.* 251. *non Thunb.*

Hab. In the Linnæan and Banksian Herbaria, probably from the Cape district. (*v. s.*)

Intermediate between *C. linifolium* and *fastigiatum.* Leaves almost those of *C. integrifolium.*

15. *C. fastigiatum*, suffruticosum, ramis numerosis suberectis, foliis lineari-vel oblongo-cuneatis apice profunde paucidentatis, floribus ad apices ramorum capitato-racemosis, pedicellis plerisque calyce brevioribus, calycibus hispidis tubo corollæ bis terve brevioribus.

α. ramis foliis que hirsutis.

β. *glabratum.*

Manulea cephalotes, *Thunb. Fl. Cap.* 470?

Hab. On the Babylonstorensbergen in Caledon, *Ecklon*, β. on the Klynriviersberge, and near Caledon, in the same district, *Ecklon, Drège.* (*v. s.*)

A low shrub, with leaves very much like those of *Salvia dentata*, remarkable for the compact racemes, consisting of from three to seven flowers with very hispid calyces.

16. *C. subspicatum*, suffruticosum, glaberrimum, ramis numerosis suberectis, foliis semiamplexicaulibus oblongis profunde paucidentatis, floribus spicato-racemosis, calycibus glabris vel brevissime ciliatis corollæ tubo bis terve brevioribus.

Hab. In Drège's collection without a precise locality. (*v. s.*)

Spikes of flowers leafy, about an inch long. All the pedicels very much shorter than the calyx.

17. *C. marifolium*, suffruticosum, procumbens, ramis cano-pubescentibus, foliis ovatis crenatis margine subrevolutis subtus vel utrinque cano-tomentosis, floribus brevissime pedicellatis oppositis subracemosis, corollæ tubo calyce duplo longiore.

Manulea virgata, *Thunb. Fl. Cap.* 470?

Hab. Vanstaadensriviersberge in Uitenhage, *Ecklon, Drège.* (*v. s.*)

Branches long, virgate. Leaves almost sessile, and very white, which does not agree with Thunberg's description.

18. *C. integrifolium*, suffruticosum laxe ramosissimum subglabrum, foliis ovatis margine subrevolutis integerrimis paucidentatisque glabris, floribus axillaribus pedicellatis superioribus laxe racemosis, corollæ tubo tenui calyce triplo longiore.

Manulea integrifolia, *Linn.!—Thunb. Fl. Cap.* 467?

β. parvifolium.

Hab. Cape district? *Herb. Linn.*, β. on the Tygerberg, *Drège.* (*v. s.*)

Habit very much that of *C. hispidum*, but leaves smaller, less toothed, and the whole plant nearly or quite glabrous.

19. *C. cuneatum*, suffruticosum, procumbens, ramis hirsutis, foliis subsessilibus obovato-rotundatis cuneatis inciso-dentatis utrinque viridibus hirtis, floribus ad apices ramorum axillaribus subracemosisve, corollæ tubo calyce bis terve longiore.

Hab. In the Hottentotsholland and Palmietriver mountains in Stellenbosch, *Ecklon.* (*v. s.*)

Habit nearly that of *C. marifolium*, but very different in leaves and inflorescence, in the latter character, it represents *C. hispidum*, but is yet more hairy. Leaves as broad as long, marked with three to five very deep teeth.

20. *C. hispidum*, suffruticosum, ramis procumbentibus vel divaricatis hirsutis, foliis ovatis oblongisve grosse dentatis basi angustatis cuneatisve pubescentibus, floribus axillaribus pedicellatis superioribus laxe racemosis, calycibus hirtis corollæ tubo ter brevioribus.

Manulea hispida, *Thunb. Fl. Cap.* 473.

Manulea oppositiflora, *Vent. Jard. Malm.* 15. *t.* 15.

Hab. Near the Cape from whence it is sent in almost all collections. (*v. s.*)

A very variable plant, especially in the degree of hairiness and the size of the leaves.

21. *C. floribundum*, ramis erectis? pubescentibus, foliis ovatis grosse dentatis basi cuneatis tenuiter pubescentibus, racemulis subcorymbosis in paniculam terminalem multiflorem dispositis, calycibus breviter pedicellatis hirtis corollæ tubo ter brevioribus.

Hab. Port Natal, *Drège.* (*v. s.*)

Leaves nearly those of *C. hispidum*, but

larger; flowers also nearly the same, but a remarkable species for its size and inflorescence, as well as from its station, far distant from that of any other species.

22. *C. cordatum*, herbaceum, ramis prostratis subradicantibus hirsutis, foliis petiolatis ovato-rotundatis dentatis basi truncatis cordatisve pubescentibus, floribus axillaribus pedicellatis, calycibus hispidis corollæ tubo vix duplo brevioribus.

Manulea cordata, *Thunb. Fl. Cap.* 473.

β. *hirsutior.*

HAB. Krakakamma and Olifantshoek in Uitenhage, *Ecklon*, Ruigtevalei, *Drège*, β. on the Witbergen, *Drège*. (*v. s.*)

Remarkable for its long trailing stems as well as for the form of the leaves, which are about half an inch long and broad. Corolla shorter than in *C. hispidum*. The var. β. may perhaps be a distinct species, but the specimens are past flower, and imperfect.

23. *C. racemosum*, herbaceum? ramis erectis pubescentibus, foliis petiolatis lato-ovatis dentatis tenuiter pubescentibus, floralibus minimis, floribus longe pedunculatis racemosis, corollæ tubo calyce duplo longiore.

HAB. Zuurebergen, *Drège*. (*v. s.*)

Leaves about half an inch or more in length, rounded or wedge-shaped at the base, floral ones sessile, scarcely two lines long. Pedicels spreading, three-fourths of an inch long. Calyx nearly glabrous, segments unequally cleft, subulate at the end.

24. *C. fœtidum*, annuum? erectum, ramosum, subglabrum, foliis longe petiolatis ovatis inciso-dentatis, pedunculis axillaribus 1—3-floris superioribus subracemosis, corollæ tubo tenui calyce bis terve longiore.

Buchnera fœtida, *Andr. Bot. Rep. t.* 80.

Manulea fœtida, *Pers. Syn.* 2. 148.

Manulea alternifolia, *Hort. Par.!—Pers. Syn.* 2. 148.

HAB. Eastern portion of Worcester and Clanwilliam districts, *Ecklon*, *Drège*, and in many of the older Cape collections. (*v. s.*)

Leaves from half an inch to an inch long. Lower pedicels almost always bearing a small corymb of about three nearly sessile flowers, upper ones often simple, forming an irregular leafy raceme.

25. *C. pedunculosum*, herbaceum, ramosissimum, procumbens, viscoso-pubescens, foliis petiolatis ovatis inciso-dentatis pinnatifidisve, superioribus parvis, pedunculis axillaribus longissimis filiformibus, corollæ tubo tenui calyce dimidio vel subduplo longiore, limbo amplo.

HAB. Zilverfontein in Namaqualand, *Drège*. (*v. s.*)

Remarkable for its intricate leafy stems, its numerous peduncles, often two inches long, and for the form of the flower, which, as far as can be ascertained from dried specimens, appears to be an approach to that of *Lyperia*. The corolla dries yellowish, with a dark-coloured faux.

LYPERIA.

Calyx 5-partitus, laciniis linearibus subfoliaceis. *Corollæ* deciduæ tubus elongatus, extus viscosus, apice latere superiore gibbus vel incurvus, limbus patens, 5-fidus, laciniis in labia 2 approximatis. *Stamina* didynama, inclusa. Herbæ, *suffrutices vel fruticuli Austro-Africana*. Folia *inferiora opposita superiora alterna, integra dentata inciso-pinnatifida vel multifida, ad axillas sæpe fasciculata*. Flores *sessiles vel sæpius pedicellati, axillares, racemosi vel spicati*. Corollæ *et interdum tota planta siccitate nigricat*. Capsulæ *plerumque exsertæ, ovoideæ vel oblongæ, plus minusve viscosæ*.

* *Flores subsessiles spicati.*

1. *L. fruticosum*, viscoso-pubescens, foliis ovatis oblongis subcordatisve integerrimis paucidentatisque floralibus conformibus calyces superantibus, capsulis oblongis calyces subæquantibus.

HAB. On the Zwartdoorn river in Clanwilliam, and Modderfontein and the Gariep plains in Namaqualand, *Drège*; also in Captain Paterson's collection. (*v. s.*)

More of a shrub than any other species. Leaves sessile, varying from three or four lines to an inch in length in the different specimens, always drying black as well as the flowering spikes.

2. *L. amplexicaulis*, herbacea? erecta, viscoso-pubescens vel villosa, foliis lato-

ovatis dentatis basi cordato-amplexicaulibus, floralibus subconformibus calyces superantibus, spicis elongatis multifloris, corollæ tubo calycem vix superante limbo parvo.

Hab. Namaqualand, *Ecklon;* Natvoet and Groen river in Clanwilliam, *Drège.* (*v. s.*)

Flowering branches about a foot high, of which the greater part is occupied by the leafy spike. Capsule nearly glabrous, scarcely as long as the calyx.

3. *L. tristis,* herbacea, erecta, viscosissima, foliis infimis petiolatis ovatis oblongisve dentatis incisisque, superioribus oblongo-lanceolatis, floralibus lanceolatis integerrimis, supremis capsula brevioribus, spica florifera densa, fructifera elongata, capsulis calyce duplo longioribus.

Erinus tristis, *Linn.—Thunb. Fl. Cap.* 476.

Hab. Cape Flats, Zwarteland, and northward as far as Brackfontein in Clanwilliam, *Ecklon, Drège,* &c. (*v. s.*)

Stems thick, rigid, often much branched, a foot or rather more in height, tube of the corolla about an inch long, divisions of the limb slightly emarginate. Capsule four to five lines long.

4. *L. fragrans,* suffruticosa, suberecta, viscosa, foliis oblongo-lanceolatis apice dentatis basi angustatis integerrimis, superioribus angustioribus subintegerrimis, floralibus calyce subbrevioribus, spica florifera densa fructifera elongata, capsulis calyce vix duplo longioribus.

Erinus fragrans, *Ait. Hort. Kew. ed.* 1. *v.* 2. *p.* 357.

Erinus lychnideus, *Thunb. Fl. Cap.* 474? *excl. syn. plur.*

Lychnidea villosa, &c., *Burm. Pl. Afr.* 13. *t.* 49. *f.* 4.

Hab. Cape Flats and Hottentotsholland, *Ecklon;* Saldanha Bay, in the Cape district, *Drège.*

Leaves very numerous at the base of the stem, the whole plant is slightly pubescent, and dries very black. Burmann's figure is a fair representation of it. Capsules four to five lines long.

5. *L. macrocarpa,* suffruticosa? caule glabriusculo, foliis oblongo-linearibus obtusis integerrimis basi angustatis tenuiter pubescentibus, floralibus calycem æquantibus, spica elongata, capsulis calyce subtriplo longioribus.

Hab. Probably in the Cape district, *Masson in Herb. Banks.* (*v. s.*)

Habit of *L. fragrans,* but leaves entire and capsules about an inch long.

6. *L. simplex,* herbacea, erecta, subsimplex, foliis infimis petiolatis ovatis subdentatis, superioribus floralibusque oblongis lanceolatisve integerrimis, spica elongata, capsulis viscoso-pubescentibus calycem vix excedentibus.

Erinus simplex, *Thunb. Fl. Cap.* 474?

Hab. Cape district? *Paterson,* &c.; False Bay, *Thunberg?* Karroo desert, *Ecklon.* (*v. s.*)

I have seen several specimens, but none of them very satisfactory, and I have doubts as to their being the same as Thunberg's plant. They all differ, however, from the three preceding species by the short thick capsules, and the flowers, and especially the capsules, more distant from each other.

** *Herbæ, foliis non fasciculatis, floribus pedicellatis racemosis.*

7. *L. tenuiflora,* pusilla, erecta, tenuiter viscoso-pubescens, foliis oblongis lanceolatisve integerrimis paucidentatisque, pedicellis calyce parum longioribus.

Hab. *Drège's* collection, without the precise station. (*v. s.*)

Whole plant scarcely four inches high. Flowers eight to ten lines long.

8. *L. racemosa,* erecta, viscosissima, foliis petiolatis ovatis argute dentatis basi longe angustatis, floribus pedunculatis racemosis, corollæ limbo amplo dimidio tubi longiore.

Hab. In the north of Clanwilliam district, and at the mouth of the Gariep in Namaqualand, *Ecklon, Drège.* (*v. s.*)

About a foot high. Tube of the corolla about nine lines long, lobes of the limb broad, shortly bifid.

9. *L. glutinosa,* herbacea, erecta, viscosissima, foliis petiolatis ovatis argute dentatis basi rotundato-truncatis, floribus pedunculatis racemosis, corollæ limbo dimidio tubi breviore.

Hab. Near the Gariep, *Drège.* (*v. s.*)

Not so tall, and more glutinous than the

last. Leaves shorter. Corolla more slender, with a much smaller limb Calyx very viscous, rather longer than the capsule.

10. *L. violacea*, decumbens vel erectiuscula, glabriuscula, foliis petiolatis oblongis dentatis, floribus paucis subracemosis, corollæ limbo dimidio tubi multo breviore, capsula ovata villosa calyce duplo longiore.

Manulea violacea, *Link.! Enum. Hort. Berol.* 2. 142.

Erinus patens, *Thunb. Fl. Cap.* 475?

Hab. Cultivated in the Berlin Garden from Cape seeds.—Hexriver, *Drège*? (*v.s.*)

Branches smooth, about six inches high. Leaves half an inch long, with a few deep teeth. Corolla seven to eight lines long, divisions of the limb entire. Drège's specimens are in fruit only, but appear to belong to this plant. *Manulea crystallina* (Weinm. Syll. Pl. Soc. Ratisb. 1. 221.) must also be very near this species, if not the same.

*** *Suffrutices vel fruticuli. Folia sæpe ad axillas fasciculata. Pedicelli axillares vel subracemosi.*

11. *L. incisa*, suffruticosa, humilis, ramosissima, foliis petiolatis obovatis ovatisve inciso-dentatis utrinque ramisque villosis, floribus paucis subracemosis, corollæ tubo calyce subsextuplo longiore limbo brevi.

Erinus incisus, *Thunb. Fl. Cap.* 476.

Hab. Cape district? *Masson in Herb. Banks.* (*v. s.*)

Corolla above an inch long.

12. *L. canescens*, suffruticosa, decumbens, ramosissima, foliis petiolatis subfasciculatis oblongis inciso-dentatis subtus vel utrinque incanis, floribus subracemosis, racemis paniculatis, pedicellis brevibus rigidis, corollæ limbo brevi, capsulis calyce dimidio longiore.

Hab. Inundated land on the Gariep, *Drège.* (*v. s.*)

Near *L. argentea*, but branches less divaricate and more rigid, pedicels shorter, flowers more numerous and smaller.

13. *L. argentea*, suffruticosa, divaricato-ramosissima, foliis petiolatis subfasciculatis ovatis oblongisve inciso-dentatis subtus vel utrinque scabro-pubescentibus subincanis, pedicellis axillaribus filiformis vel supremis subracemosis, corollæ limbo tubo dimidio breviore.

Manulea argentea, *Linn.!—Thunb. Fl. Cap.* 472.

α. foliis subtus albidis.

β. foliis utrinque subviridibus.

γ. scabrior foliis obtusioribus.

Hab. Uitenhage district, from the Vanstaadensberge to the Boshman's river, *Ecklon, Drège*, &c., and on the Umtata, in the Amakosa country, *Drège.* (*v. s.*)

Branches long, with numerous slender branchlets. Lower leaves near half an inch long, those of the branches smaller. Pedicels six to ten lines, corolla five to six lines, capsule about one line long. A plant very variable in pubescence, and generally drying rather blackish, seldom deserving the name of *argentea.*

14. *L. pedunculata*, suffruticosa, divaricato-ramosissima, tenuiter pubescens, foliis petiolatis subfasciculatis obovato-cuneatis inciso-dentatis, pedicellis elongatis axillaribus filiformibus, calyce corollæ tubo 3—4-plo breviore, corollæ limbo tubo parum breviore.

Buchnera pedunculata, *Andr. Bot. Rep. t.* 84.

Manulea pedunculata, *Pers. Syn.* 2. 184.

Hab. Raised in gardens, from Cape seeds, precise station unknown. (*v. s. c.*)

Habit of *L. argentea.* Resembles also *L. cuneata*, but the leaves are several times larger, and stalked, and the pedicels above an inch long.

15. *L. phlogiflora*, suffruticosa, decumbens, ramosissima, foliis fasciculatis petiolatis oblongis inciso-dentatis pinnatifidisve tenuissime pubescentibus glabrisve, racemis laxis viscoso-pubescentibus, corollæ limbo amplo laciniis emarginatis tubo æquilongis.

Hab. On the Keiskamma, *Drège*, (*v.s.*)

Differs from *L. argentea* chiefly by the leaves, which are smaller and more deeply toothed, and by the large expanded limb of the corolla.

16. *L. crassicaulis*, suffruticosa, basi decumbens ramosissima, ramis strictis rigidis scabris, foliis petiolatis ovatis pinnatisectis segmentis oblongo-cuneiformibus

integris 2—3-fidisve scabris, racemis strictis, pedicellis calyce subbrevioribus, corollæ limbo brevi laciniis emarginatis.

HAB. Wildshutsberg and Witbergen, *Drège.* (*v. s.*)

From half a foot to a foot high. Dries black, and covered with glandular dots which become white when dry.

17. *L. mollis,* suffruticosa, molliter villosa, ramis elongatis procumbentibus, foliis subfasciculatis petiolatis ovatis inciso-pinnatifidis pinnatisectisve, laciniis ovatis integris incisisve, pedicellis axillaribus filiformibus, corollæ tubo calyce vix duplo longiore.

HAB. Graham's Town in Albany and Zuureberg in Uitenhage, *Ecklon,* Colesberg, *Drège.* (*v. s.*)

Branches slender. Pedicels eight to ten lines long. Corolla four to five lines.

18. *L. filicaulis,* suffruticosa, pubescens, ramis elongatis tenuibus procumbentibus, foliis subfasciculatis petiolatis obovato-subrotundis inciso-pinnatifidis, laciniis obovatis obtusissimis, pedicellis axillaribus filiformibus.

HAB. On the Witbergen, *Drège.* (*v. s.*)

Although the specimens are past flower, they show that the species is distinct from the preceding.

19. *L. pinnatifida,* suffruticosa, decumbens, ramosissima, foliis pinnatisectis, segmentis oblongo-cuneatis integris dentatis pinnatifidisve, floribus subracemosis, corollæ tubo calyce 3—4-plo longiore.

Manulea pinnatifida, *Linn.—Thunb. Fl. Cap.* 473.

α. canescens, capsulis calyce vix dimidio longioribus.

β. subcanescens, capsulis calyce subduplo longioribus.

γ. viscoso-pubescens, capsulis calyce subduplo longioribus, corollis minoribus.

δ. subbipinnatisecta, corollis majoribus.

ε. microphylla, viscoso-pubescens.

HAB. Karroo desert and Karroid places, from Beaufort to the Fish river, *Ecklon, Drège,* and other collections. (*v. s.*)

Evidently a very variable plant, and perhaps some of the above varieties may be distinct species, but very difficult to separate in the dry state. Leaves from three to six lines, segments usually convolute or conduplicate. Flowers few, pedicels rather stiff. Tube of the corolla four to five lines, limb two to three lines long, divisions obtuse or very slightly emarginate.

20. *L. multifida,* suffruticosa, procumbens, ramosissima, foliis subfasciculatis bipinnatisectis, segmentis plerisque petiolulatis oblongo-cuneatis integris incisis pinnatifidisve, racemis paucifloris, calycis laciniis lineari-spathulatis corollæ tubo vix dimidio brevioribus.

HAB. Sternbergspruit and Stormbergen, *Drège.* (*v. s.*)

Leaves much more divided, and flowers much smaller than in *L. pinnatifida.*

21. *L. foliolosa,* fruticosa, divaricato-ramosissima, foliis parvis fasciculatis lineari-cuneatis dentatis pinnatifidisve utrinque canescentibus, floribus subracemosis corollæ tubo calyce subtriplo longiore.

HAB. Karroid places, Zwartehopf and Langekloof, *Ecklon,* between the little Fish river and Brak river, *Drège,* and in other Uitenhage collections. (*v. s.*)

Leaves one to three lines longer, much narrower, less cut, and whiter than in *L. pinnatifida ε,* which it resembles.

22. *L. cuneata,* fruticosa, ramosissima, foliis minutis fasciculatis apice bi-tridentatis rarius integerrimis glabriusculis vel tenuissime pubescentibus, floribus subracemosis, corollæ tubo calyce 3—4-plo longioribus.

HAB. On and near the Gauritz river, *Drège.* (*v. s.*)

Leaves intermediate between those of *L. foliolosa* and *L. atropurpurea.* Differs from *L. pedunculata* by the minute sessile leaves and peduncles seldom half an inch long. Can it be the wild state of this plant?

23. *L. atropurpurea,* fruticosa, ramosissima, foliis minutis fasciculatis linearibus integerrimis vel rarius unidentatis, floribus subracemosis, corollæ tubo calyce 6—7-plo longiore.

Manulea atropurpurea, *Herb. Banks.*

HAB. Karro and Karroid districts, *Ecklon, Drège,* &c. (*v. s.*)

Leaves glabrous or pubescent, one to

two lines long. Corolla near an inch long. Capsule larger than in the neighbouring species. The cultivated specimens only differ in their leaves rather longer.

24. *L. aspalathoides*, fruticosa, ramosissima, foliis minutis fasciculatis oblongis linearibusve integerrimis, floribus racemosis, corollæ tubo calyce 2—3-plo longiore.

HAB. Grasrugg and Krakakamma in Uitenhage, *Ecklon*. (*v. s.*)

Leaves smaller than in *L. atropurpurea*, narrower than in *L. microphylla*, and not imbricated. Flowers about half an inch long. Branches pubescent. Leaves glabrous.

25. *L. microphylla*, fruticosa, ramosissima, foliis minutis ovatis integerrimis ad axillas fasciculatis, ramulorum juniorum quadrifariam imbricatis, floribus versus apices ramorum paucis.

Manulea microphylla, *Linn.!—Thunb. Fl. Cap.* 466.

HAB. Karroid districts, Zwartkops river, *Ecklon*, near Garip and between Ado and Zondag river, *Drège*, and other collections. *v. s.*)

Leaves scarcely half a line long. Flowers about half an inch. Divisions of the limb broad, obovate.

XI. MANULEA. *Linn.*

Nemia, *Berg. Fl. Cap.*

Calyx 5-partitus, laciniis linearibus subulatisve. *Corollæ* deciduæ tubus elongatus, extus glaber vel tomentosus, apice subrectus, limbo 5-partito æquali vel laciniis 4 superioribus magis approximatis. *Stamina* didynama inclusa. Herbæ *rarius suffrutices Austro-Africana.* Folia *sæpe ad basin caulis approximata, floralia parva bracteæformia.* Flores *racemosi, racemis nunc simplicibus nudis vel minute bracteatis, nunc compositis pedicellis multifloris.* Corollæ *sæpe aurantiacæ, siccitate non nigricantes.* Capsulæ *glabræ.*

* *Pedicelli uniflori. Corollæ laciniæ bifidæ, obcordatæ, obovatæ vel rarius oblongæ obtusæ. Folia subradicalia, pedunculis scapiformibus simplicibus nudis vel minute bracteatis apice racemosis.*

1. *M.? nervosa* (E. Meyer, MSS.), foliis petiolatis obovato-oblongis ovatisve integerrimis glabris, laciniis calycinis lato-lanceolatis, corollæ laciniis latis emarginatis, binis supremis ultra medium connatis integerrimis.

HAB. Zilverfontein in Namaqualand, *Drège*. (*v. s.*)

A very distinct species, which ought, perhaps, to be considered as forming a separate genus. Three to four inches high. Calycine segments broader and thicker, tube of the corolla shorter, limb larger, and less deeply cleft than in any other species.

2. *M. silenoides* (E. Meyer, MSS.), annua, foliis petiolatis ovatis integerrimis vel obscure dentatis, laciniis calycinis linearibus, junioribus basi submembranaceo-connexis, fructiferis capsulam superantibus, corollæ laciniis emarginato-bifidis.

β. minor. E. M.

HAB. Karakuis, *Drège*, *β.* between Micrenkasteel and Zwartdoorn river in Clanwilliam, and Modderfontein in Namaqualand, *Drège*. (*v. s.*)

Stature of *M. nervosa*, but much more slender. Tube of the corolla longer, limb smaller, with narrow segments.

3. *M. androsacea* (E. Meyer, MSS.), foliis obovato-oblongis glabris integerrimis subcrenatisve, pedunculis glabris racemis subcapitatis, laciniis calycinis oblongo-linearibus glabris capsulam æquantibus, corollæ tubo calyce 3—4-plo longiore, limbi laciniis obovatis retusis.

HAB. Sands near Noagas, *Drège*. (*v. s.*)

Rather taller than *M. silenoides*. Leaves rather longer and narrower. Flowers nearly sessile, mostly forming a compact head, which is sometimes elongated in the manner often termed *proliferous*.

4. *M. corymbosa* (Thunb. Fl. Cap. 472.), foliis ovato-oblongis obovatis integris dentatisque glabris vel tenuiter pubescentibus, pedunculis scapiformibus interdum 1—2-foliatis, racemis fructiferis elongatis, laciniis calycinis linearibus capsula longioribus basi margine membranaceo-ciliatis, corollæ laciniis late obovatis.

HAB. Cape district, *Ecklon*, *Drège*, &c. (*v. s.*)

From six inches to a foot high. Flowers

often reflexed. Tube of the corolla three lines long, orifice hairy.

5. *M. altissima* (Linn.!—Thunb. Fl. Cap. 472.), foliis oblongo-ellipticis lanceolatisve subdentatis tenuiter pubescentibus, pedunculis longissimis interdum 1—2-foliatis, racemis fructiferis oblongis densis, laciniis calycinis capsula longioribus pubescenti-scabris.

HAB. Cape district, *Ecklon, Drège,* &c. (*v. s.*)

Peduncles or flowering stems often a foot and a half high, sometimes with one or two branches.

6. *M. longifolia,* foliis oblongo-lanceolatis integerrimis vel obscure dentatis glabriusculis, ramis floriferis elongatis ramosis subnudis vel basi paucifoliatis, racemis fructiferis elongatis, calycibus brevissime pedicellatis, laciniis lanceolatis hispidis capsulas subsuperantibus.

HAB. Ebenezer, *Drège.* (*v. s.*)

Perhaps a variety of *M. altissima,* but besides the branched stems, narrow racemes, &c., the corolla appears to be much smaller.

7. *M. bellidifolia,* foliis obovatis oblongisve subcrenatis glabris vel tenuiter pubescentibus, racemis fructiferis elongatis capsulis remotis, laciniis calycinis lanceolatis subglabris, corollæ laciniis oblongo-ovatis.

HAB. Uitenhage district, Katriviersberg Addo and Quaggsvlakte, *Ecklon,* Klipplaats river, *Drège.* (*v. s.*)

Near *M. corymbosa* but readily distinguished by the calyx. Leaves of *Bellis sylvestris.*

* *Thyrsifloræ. Racemi compositi, pedicellis fasciculato-plurifloris. Corollæ laciniæ integerrimæ oblongæ obtusæ. Caules sæpe foliosi.*

8. *M. incana,* (Thunb. Fl. Cap. 468.) suffruticosa, humilis, ramosissima, foliis ad basin ramorum approximatis petiolatis oblongis obtusis apice dentatis basi angustatis utrinque incanis, ramis floriferis erectis subnudis racemosis, pedunculis brevissimis 1—3-floris, calycibus incanis tubo corollæ vix brevioribus.

HAB. Near the Cape? (*v. s. in herb. Banks.*)

A very distinct species by its habit which is that of *Chœnostoma halimifolia.* Calyx three to four lines long, cleft to the middle only. Divisions of the corolla narrow oblong.

9. *M. crassifolia,* perennis, foliis subradicalibus oblongo-ellipticis spathulatisve obtusis et obtuse subdentatis utrinque glaberrimis, caulibus subnudis, racemo elongato interrupto, floribus fasciculatis, calycis laciniis membranaceo-connatis apice lanceolato-linearibus capsulam subæquantibus, corollæ tubo calyce 2—3-plo longiore.

HAB. Moogplats and Witbergen, *Drège.* (*v. s.*)

Very smooth and almost glaucous. Varies in height from three to four inches to a foot and a half.

10. *M. juncea,* perennis, glaberrima, glauca, ramis strictis erectis junceis paucifoliatis, foliis oblongo-linearibus remote dentatis pinnatifidisve superioribus linearibus integerrimis, racemo composito brevi paucifloro, calycis laciniis subulatis capsulam subsuperantibus, corollæ tubo calyce 4—5-plo longiore.

HAB. Giftbergen, *Drège.* (*v. s.*)

Branches above two feet high. Raceme two to seven inches long. Calyx slightly pubescent. Tube of the corolla about half an inch long.

11. *M. rigida,* erecta, scabro-pubescens, ramis divaricatis, foliis lanceolatis inciso-dentatis pinnatifidisve, racemis elongatis, floribus subfasciculatis brevissime pedicellatis, calycis laciniis apice subulatis capsulas duplo superantibus, corollæ tubo calyce vix duplo longiore.

HAB. Clanwilliam district: Olifants river and Brackfontein *Ecklon,* Wupperthal, *Drège.* (*v. s.*)

Stature of *M. juncea* but branching in the upper part. Leaves sessile or embracing the stem, often erect with the midrib very prominent. Pedicels 1—5-flowered. Corolla of *M. juncea.*

12. *M. densiflora,* perennis, ramosa, pubescens, foliis caulinis oblongo-linearibus subintegerrimis dentatisque, racemis densis subspicæformibus, calycis laciniis subulatis capsulas subsuperantibus, corollæ tubo crassiusculo.

HAB. Clanwilliam district: Olifants river and Brackfontein, *Ecklon.* (*v. s.*)

Inflorescense of *M. juncea,* but different in habit and foliage.

13. *M. parviflora,* perennis, caule erecto subramoso paucifoliato pubescente, foliis radicalibus oblongo-spathulatis obovatisve, caulinis linearibus integerrimis paucidentatisque, racemis elongatis tenuibus multifloris rhachi pubescenti, calycibus minutis laciniis linearibus capsula truncata brevioribus.

HAB. Near the Omtata in the Amaponda country, *Drège.* (*v. s.*)

Near *M. rubra* and *leiostachys* but much more slender, and tube of the corolla scarcely two lines long.

14. *M. leiostachys,* perennis, caule erecto basi pubescente, foliis pubescentibus inferioribus longe petiolatis oblongis dentatis, superioribus oblongo-spathulatis linearibusve paucidentatis, racemis multifloris elongatis cauleque superne glaberrimis, calycis laciniis linearibus obtusis capsula vix brevioribus.

HAB. Cederbergen in Clanwilliam, and Gnadenthal (in Caledon ?), *Drège.* (*v. s.*)

Taller and more erect than *M. rubra* with more numerous and slender flowers, and readily distinguished by the glabrous almost glaucous surface of the upper part of the plant.

15. *M. rubra,* (Linn.—Thunb. Fl. Cap. 472.) perennis caule erecto vel basi decumbento villoso, foliis oblongo-lanceolatis dentatis basi angustatis utrinque pubescentibus villosisve, racemo interrupto subramoso, calycis laciniis lineari-oblongis obtusis capsula subdimidio brevioribus, corollis calyce 3—4-plo longioribus.

Nemia rubra, *Berg. Fl. Cap.*

Manulea angustifolia, *Link. Ic. Pl. Sel.* 7. *t.* 2. *optime.*

HAB. Cape Flats and Downs and Hottentotsholland, *Ecklon, Drège, &c.* Very common in Cape collections. (*v. s.*)

Very variable in the number of flowers and degree of hairiness. Flowers half an inch long or rather shorter.

16. *M. obovata,* perennis, caule basi decumbente pubescente, foliis radicalibus ovatis caulinis obovatis oblongisve grosse crenatis subincisisve utrinque pubescentibus, racemo elongato multifloro subramoso, calycis laciniis linearibus obtusis capsula subbrevioribus, corollæ tubo calyce 2—3-plo longiore.

HAB. Algoa Bay, *Forbes, Ecklon.* (*v. s.*)

Varies in the breadth of the leaves. Flowers much more numerous than in *M. rubra,* corollas and capsules not half the size.

17. *M. tomentosa,* (Linn.—Thunb. Fl. Cap. 470.) caule decumbente humili ramoso tomentoso-villoso, foliis obovatis oblongisve dentatis crassis utrinque dense tomentosis, racemo brevi denso, calycis laciniis lanceolato-linearibus villoso-tomentosis capsulas subæquantibus.

Selago tomentosa, *Linn. Spec.* 877.

Manulea tomentosa, *Bot. Mag. v.* 9. *t.* 322 *male—Link et Otto. Ic. Pl. Sel.* 45. *t.* 19 *bene.*

HAB. Near the Cape and in Hottentotsholland, *Ecklon, Drège, &c.* (*v. s.*)

Branches short and rigid, racemes two to three inches long.

18. *M. thyrsiflora* (Linn.—Thunb. Fl. Cap. 471.) caule erecto flexuoso ramoso tenuissime pubescente, foliis obovatis grosse dentatis glabriusculis, racemo paniculæformi multifloro, pedunculis laxe cymosis, calycis laciniis linearibus, corollæ tubo calyce 3—4-plo longiore tenui, limbi laciniis oblongo-linearibus obtusis.

HAB. Cape district, *Ecklon, Drège, &c.* (*v. s.*)

Raceme or panicle above half a foot long. Lower cymes opposite, upper ones alternate, all loosely dichotomous. Corolla slender, tube about three lines long.

19. *M. paniculata,* erecta, elata, ramosa, cano-pubescens, foliis ovatis obovatisve grosse crenatis, panicula maxima, racemis numerosis basi foliosis elongatis multifloris, pedunculis cymosis, calycis laciniis oblongo-linearibus obtusis, corollæ tubo calyce triplo longiore limbi laciniis ovatis.

HAB. Stormbergen and near the Krai river, *Drège.* (*v. s.*)

Stems thick and hard. Panicle a foot long, branches erect, cymes much denser than in *M. thyrsiflora.*

20. *M. turritis* (Herb. Banks, MSS.)

caule vel ramis erectis ramosis hirsutis, foliis petiolatis ovatis oblongisve inciso-dentatis basi angustatis utrinque hirsutis, racemo elongato tenui, floribus fasciculatis, calycis laciniis linearibus obtusis, corollæ tubo gracili calyce 5—6-plo longiore, laciniis oblongo-linearibus obtusis.

HAB. Rocks of Nieuwekloof, *Drège*. Occurs also in other Cape collections. (*v. s.*)

Remarkable for the white hairs of the stem, racemes and flowers nearly those of *M. leiostachys* but foliage and habit very different. It has the appearance of being occasionally shrubby at the base.

*** *Acutiflori, racemis compositis vel subsimplices. Corollæ laciniæ omnes vel superiores subulato-acuminatæ.*

21. *M. stellata*, caule adscendente pubescente parce ramoso, foliis petiolatis lato-ovatis inciso-serratis pubescentibus, racemo elongato composito laxo multifloro, calycis laciniis lineari-subulatis, corollæ tubo calyce triplo longiore.

HAB. Mountains of Cape and Worcester districts. *Ecklon*. (*v. s.*)

An elegant species with slender orange-coloured flowers, three to seven on each peduncle.

22. *M. exaltata* (Herb. Banks, MSS.), caule erecto divaricato ramoso pubescente, foliis petiolatis lato ovatis inciso-serratis pubescentibus, racemis gracillimis paucifloris interruptis basi foliosis, calycis laciniis lineari-subulatis corollæ tubo dimidio brevioribus.

HAB. Cape and Clanwilliam districts, Olifants river, Brackfontein, and Bergvalei, *Ecklon*. Occurs also in the Banksian herbarium. (*v. s.*)

Branches slender, peduncles very short, 1—3-flowered, remote. Flowers half as large as in *M. stellata*.

23. *M. cheiranthus* (Linn. Mant. 88.) foliis subradicalibus ovatis obovatis oblongisve, pedunculis scapiformibus erectis simplicibus, racemis compositis, corollæ tubo vix exserto, limbi laciniis superioribus longissime subulatis.

Nemia cheiranthus, *Berg. Fl. Cap.* 160.

Lobelia cheiranthus, *Linn. Spec.* 131.

Cheiranthus, &c., *Comm. Hort. Amst.* 2. 83. *t.* 42.

Manulea rhynchantha *Link. Enum. Hort. Berol.* 2. 142.

β. floribunda.

HAB. In various places in the western districts from the Cape to the Gariep river in Namaqualand. (*v. s.*)

It is the great disproportion in length of the five divisions of the flower in this species, that was the origin of the generic name.

24. *M. pusilla* (E. Meyer MSS.), foliis subradicalibus obovatis oblongisve subdentatis, pedunculis scapiformibus numerosis suberectis, racemis subsimplicibus, corollæ tubo vix exserto, laciniis limbi vix inæqualibus tubo subbrevioribus.

HAB. Zilverfontein in Namaqualand, *Drège*. (*v. s.*)

Very near the last but much smaller with very much smaller flowers.

25. *M. gariepina*, foliis subradicalibus ovatis obovatis oblongisve, pedunculis scapiformibus erectis subramosis, racemis compositis multifloris, corollæ tubo calyce plus duplo longiore, limbi laciniis inæqualibus.

HAB. Plains of the Gariep in Namaqualand, *Drège*. (*v. s.*)

This again is near *M. cheiranthus*, but different in the flowers. In both this and the preceding species the lower segments are frequently and sometimes perhaps all of them obtuse, so as to connect this section with the two first.

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M. virgata, *Thunb. l. c.* 470. Near *M. turritis*?

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TEMPLE OF SREE PADA, SUMMIT OF ADAM'S PEAK.

(The Trees are Rhododendron arboreum.)

Abutilon graveolens

Swan Sc.

Argyreia bracteata

IV

V

9.

VII

Polygala Sarana

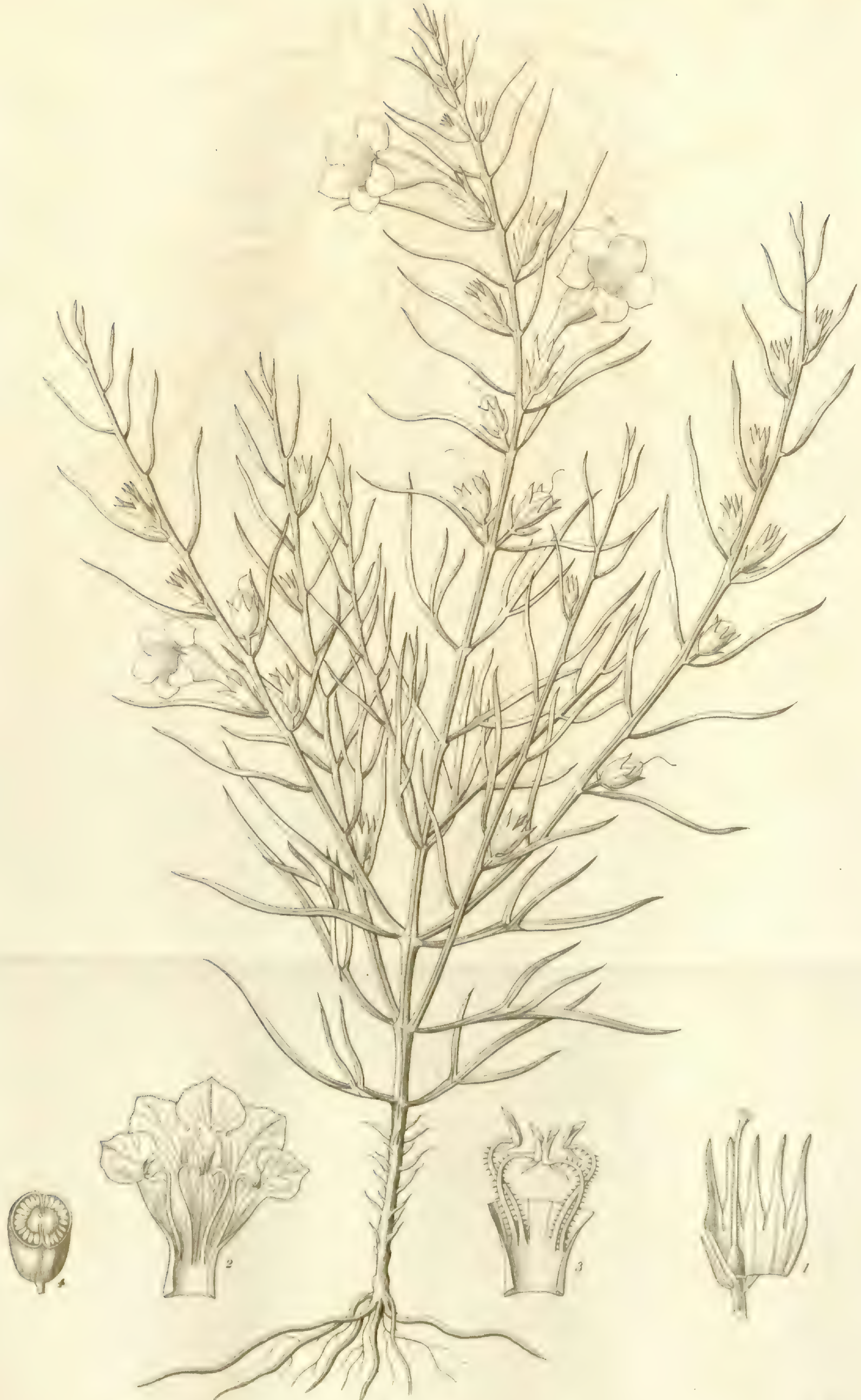
Vitis carnosa.

Swan Sc.

Riccia fluitans.

W. Wilson del.

X



Gerardia delphinifolia

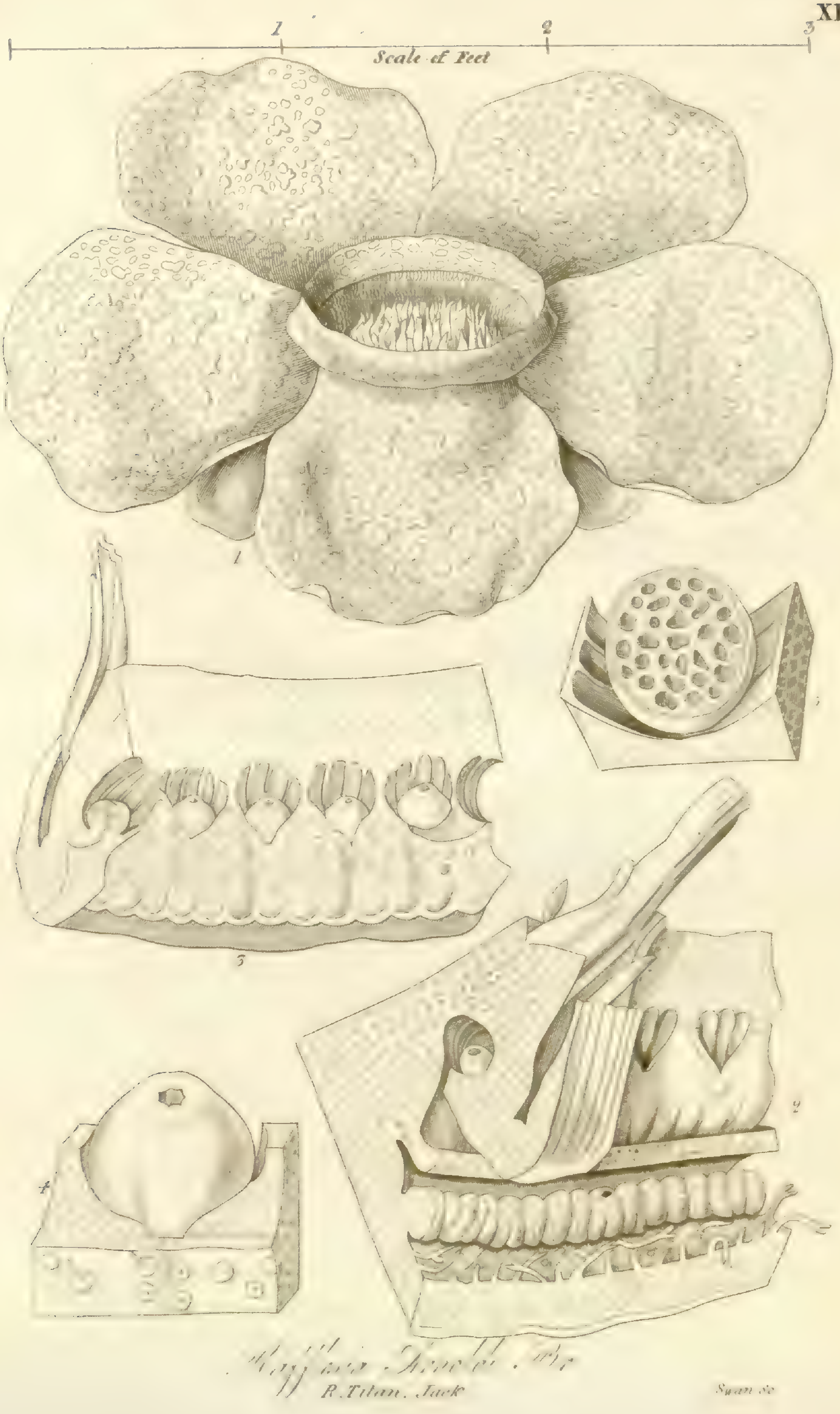
XII

Carissa Carandas

XIII

Loranthus cuneatus

XIV

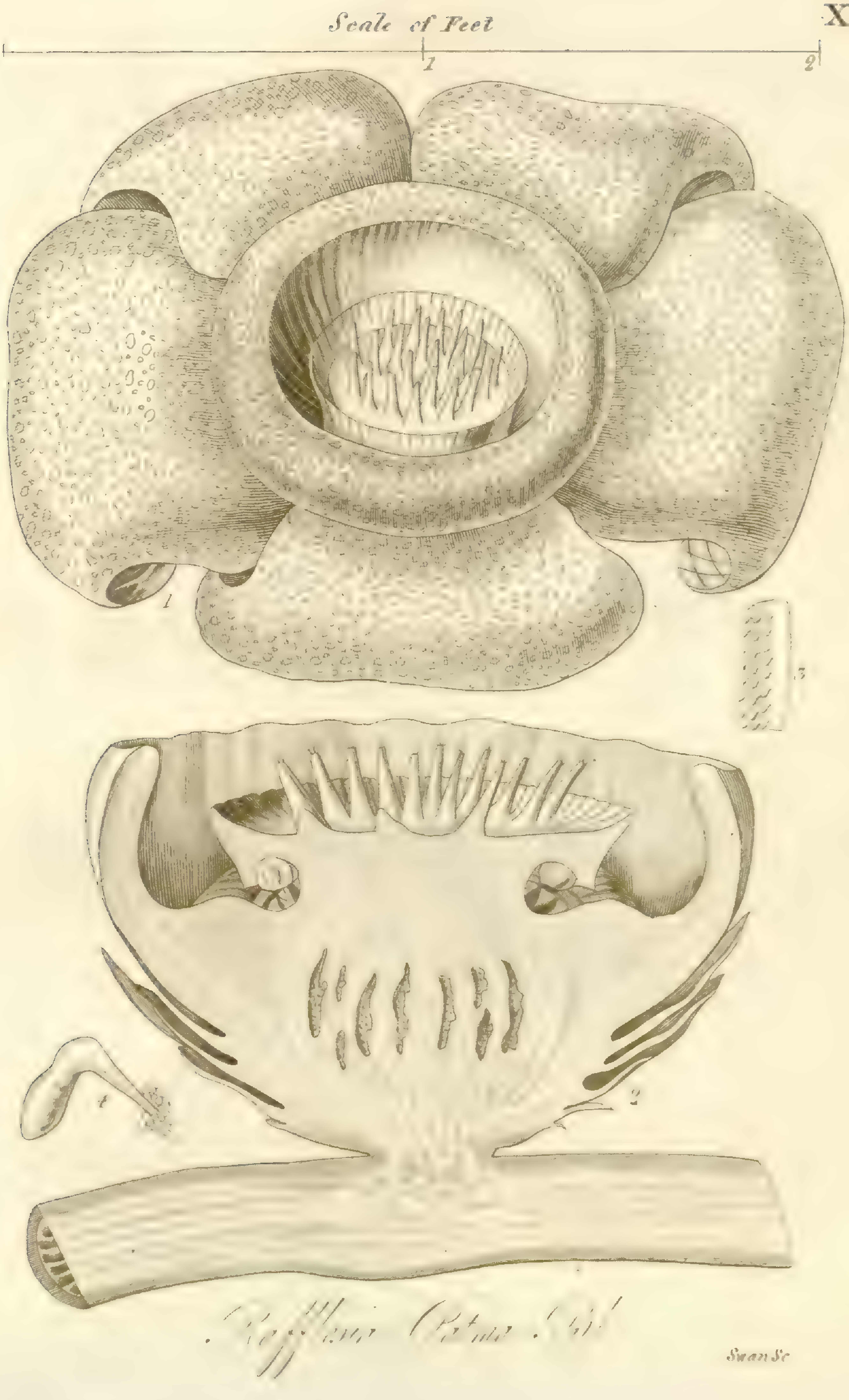


Rafflesia Arnoldi. Br.

R. Titan. Jack

Swan Sc

XV



Rafflesia Patma Bl.

Swan Sc

Indigofera trita

Swan Sc.

M Spanoghe Del.

Antiaris toxicaria

Swan Sc.

TAB XVIII.

Impatiens Walkeri.

Mrs Col. Walker del. Swan Sc.

TAB. XIX.

Striga orobanchoides.

Swan Sc.